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Report of the Industrial
Inquiry Commission Into
CANADIAN RAILWAY
PENSION PLANS
(Benefits, Financing and Administration)



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**Report of the Industrial Inquiry Commission
Into
CANADIAN RAILWAY
PENSION PLANS
(Benefits, Financing and Administration)**

*(Pursuant to Section 196 of
the Canada Labour Code (Part V – Industrial Relations))*

SEPTEMBER 1976

Dr. Noel A. Hall
Vancouver, B.C.
COMMISSIONER

**Report of the Industrial Inquiry Commission
Into
CANADIAN RAILWAY
PENSION PLANS
(Benefits, Financing and Administration)**

*(Pursuant to Section 196 of
the Canada Labour Code (Part V – Industrial Relations))*

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Available by mail from

Printing and Publishing
Supply and Services Canada
Ottawa, Canada K1A 0S9
or through your bookseller.

Catalogue No. L35 - 1976/1
ISBN 0-660-00560-3

Price: Canada: \$3.50
Other countries: \$4.20

Price subject to change without notice.

8th September, 1976

The Honourable John Munro
Minister of Labour
Parliament Buildings
Ottawa, Ontario

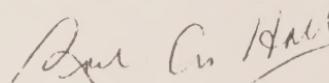
Dear Mr. Minister,

I enclose herewith my report as Commission of Inquiry into Canadian Railway Pension Plans.

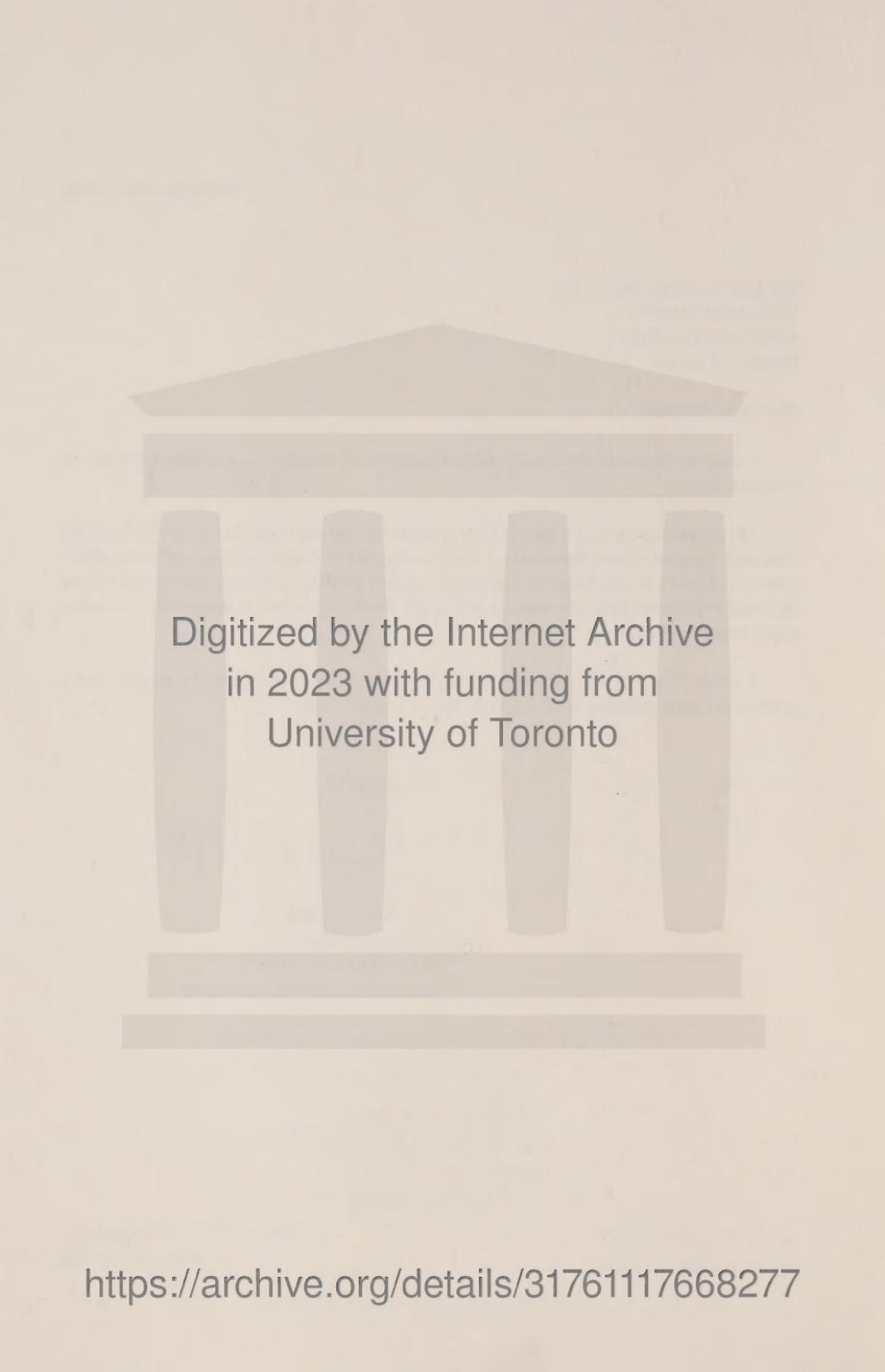
My report has been a long time in the making, but the problems involved are difficult and complex. From the outset, I have attempted to conduct a thorough and workmanlike Inquiry in the hope of resolving as many of the issues as possible and where that has not always been possible, at least indicate the direction in which effective solutions might be found.

I would like to thank you for placing your confidence in me in this matter and I trust that I have adequately discharged my responsibilities.

Respectfully,



Dr. Noel A. Hall
Commissioner
6531 Wiltshire Street
Vancouver, British Columbia



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The Honourable John Munro
Minister of Labour
Parliament Buildings
Ottawa, Ontario
Canada

Dear Mr. Minister:

On July 9th, 1974 you appointed me a Commission of Inquiry, pursuant to Section 196 of the Canada Labour Code, to undertake a comprehensive inquiry into the benefits, financing, and administration of Canadian Railway Pension Plans. The inquiry was to concern all aspects of pension plans of railroad companies set-out in Schedule "A" of my terms of reference.

For your convenience, and that of the various parties and individuals who have an interest in my report and recommendations, the details of my terms of reference as amended are as follows:

**Appointment of Commission of
Inquiry (and Amendments)**

Whereas railway pension plans continue to be a major concern affecting industrial relations in the railway industry;

AND WHEREAS railway employees have expressed concern as to the adequacy of the aforementioned railway pension plans;

AND WHEREAS, since these railway pension plans have and could continue to adversely affect industrial peace in the Railroad Industry, the Minister of Labour considers it advisable to cause a comprehensive inquiry to be made into the benefits, financing and administration of railway plans;

NOW, THEREFORE, the Minister of Labour, pursuant to Section 196 of the Canada Labour Code, hereby appoints Dr. Noel Hall of the City of Vancouver of the Province of British Columbia, as a Commissioner to hold and cause a comprehensive inquiry to be made into and concerning all aspects of pension plans of Railroad Companies set out in the Schedule hereto (amendment dated the 30th day of September, 1974).

Without restricting the generality of the Commission's terms of reference it shall particularly investigate and report with recommendations upon the following matters:

1. The cost of living indexing of pension benefits;

2. The application of the two per cent formula in Railway Pension plans for services done by employees prior to 1956;
3. Benefits for survivors of pensioners and employees;
4. The soundness and suitability of the present actuarial methods and bases of funding the plans and of possible alternative methods and bases of funding, notwithstanding existing statutory requirements;
5. The future development of the Canada and Quebec Pension plan benefits and liabilities;
6. Contributions to the Pension Funds made by employees and employers;
7. The trusteeship and administration of Railway Pension Plans and Funds;
8. Any matter incidental to or relating to any of the foregoing matters including, without restricting the generality of the foregoing, an actuarial evaluation of the long- and short-term implications of the costs and other obligations inherent in its findings as these may affect the employees and the employers involved.

The Commission shall also compare Railway Pension Plans in all their aspects with those of the Public Services, Crown Corporations and like plans of relevant employers in the private sector.

The Commissioner shall appoint a panel of independent, qualified actuaries to advise him with respect to item 4 and with respect to the costs of any findings or recommendations which he makes.

The said Commissioner may engage the services of such actuaries, accountants, technical advisors or other experts or assistants as he deems necessary or advisable to assist in the Commission of Inquiry (amendment date the 23rd day of October, 1974).

IN WITNESS WHEREOF the Minister of Labour has hereby set his hand and affixed his seal of office at Ottawa, this 9th day of July, 1974.

“John Munro”

Minister of Labour

Over the past twenty-odd years I have accepted numerous appointments as a mediator, arbitrator, and Commissioner of Inquiry into a variety of industrial disputes at both the provincial and federal levels of jurisdiction. Without doubt, my current assignment has been the most difficult and complex that I have ever encountered. As indicated by my terms of reference, the issue of railway pension plans has been a continuing source of concern affecting industrial relations in the railway industry for many years. My task has been complicated by the highly technical nature of the issues involved. The whole field of pension and retirement plans rests on the reliability of actuarial assumptions, the exigencies of the investment marketplace, and on a great number of variables affecting the cost-of-living and the rate of inflation experienced in recent years, as well as assumptions concerning future trends in all of these and other factors influencing individual and collective expectations.

Early in my Inquiry, it became obvious that significant philosophical differences concerning the role and function of pension plans existed among the parties and these differences in perspective have made effective communications extremely difficult. I shall deal with some of these difficulties at a later stage in my report.

The dispute does not simply involve the the major railway companies (Canadian National Railways Limited and the Canadian Pacific Railway Company) and the railway unions (as represented by the Canadian Railway Labour Association). Various associations of retired railway employees have been formed across Canada, representing pensioners of both the C.N.R. and the C.P.R. There also exists at the national level the Canadian Railway Employees Pensioners Association (C.R.E.P.A.). At times, these associations work in concert towards achieving common objectives; at other times and on differing issues, they often appear to be working at cross-purposes. They appear to share a common belief that their interests as retired employees have not always been well represented by the Canadian Railway Labour Association (C.R.L.A.); nor by the major railway employers.

My Commission has been further complicated by the fact that I have received representations from hundreds of individual pensioners concerning their views about the adequacy of their pensions. Many of these representations arise from deep feelings of injustice brought on by a rapid decline in the purchasing power of their pensions since retirement. Others allege arbitrary treatment by their employers in determining pension entitlements and some reflect a lack of confidence in those who purport to represent their interests. These latter feelings are particularly strong among pensioners with many years of dedicated and faithful service during periods of relatively low wages, who now find their pensions seriously eroded by inflation.

Mr. Minister, it might be useful to you and to others reading this report, if I were to cite an example of the deep-rooted sense of injustice felt by many railway pensioners. There follows a letter from Mr. B. H. Emerson, a retired employee of the C.P.R., setting out his employment history and pension status, together with a family history of his father, his son, and various other relatives who were employed by the C.P.R.

Apt. 1807, Seton Villa
3755 McGill Street
N. Burnaby, B.C.
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Dr. Noel A. Hall
U.B.C.
Vancouver

Dear Doctor,

I am enclosing a copy of my family record with the Canadian Pacific.

I retired in 1947 when I was sixty five. Wages and pensions were very low at that time.

The company gave increased pensions and benefits to those who retired after January first, 1953. Nothing whatever was given to those who retired prior to that date.

Our organization here sent two delegations to Montreal to try to persuade the company to give consideration to those who retired before 1953.

Nothing was accomplished, even the union members of the pension board were not interested in their retired members, they only wanted to get benefits for those still working who elected them to their high paid jobs.

It is hard to understand how a company like the Canadian Pacific could be so indifferent to the plight of those who gave so much for so little.

At ninety two my eyesight is considerably impaired so I make mistakes in typing.

I do hope you can obtain some help for us old timers.

My pension is #83.53.

Yours truly,

B. H. Emerson

Vancouver, B.C., Sept. 23, 1974

In the Spring of 1883 my father, Robert G. Emerson, and my mother brought me from Clinton, Ontario, to Rat Portage, now Kenora. I was one year old.

Father came west to join his uncle, Robert W. Emerson, who was a Locomotive Engineer working on the construction of the C.P.R.

Father started work for the Company in the shops there. Eventually he became a Locomotive Engineer and was killed in a wreck on the Snowflake Branch on January 8th, 1906, three months short of his 47th year.

Robert W. moved from Rat Portage to Moose Jaw and was a Passenger Engineer there until he was killed in a wreck in September, 1905.

I started work for the Company in September, 1901, as Assistant Agent at Pilot Mound. Continued as Operator and Relieving Agent until I took over the Agency at Plum Coulee on February 14th, 1906.

A few years later my wife was appointed assistant there and worked for twenty years, becoming a qualified telegrapher and agent.

Our son, Robert A. Emerson, was born there on April 12th, 1911. He finished High School when he was 14 and entered the University of Manitoba. Graduated in 1930, Gold Medalist, as a Civil Engineer.

Although he had worked for the Company in summers, there was no opening at the start of the Depression.

He worked for the Highway Department of the Ontario Government, doing survey work in the Kenora District.

He was given a Strathcona Scholarship and spent a year at Yale.

Later he was appointed Transit Man in Vancouver. He advanced to Roadmaster at Deloraine, the youngest man to ever hold that position on the C.P.R. He advanced through the Engineering Department of the Company to Chief Engineer in Montreal, then to Vice-President and followed Mr. Crump in the President's Chair.

He was invested as a Knight of the Order of St. John of Jerusalem by Governor General Vanier and was given an honorary degree of Doctor of Laws by the University of Manitoba.

Unfortunately he died of a heart attack on March 14, 1966.

My grandson, Cameron Bruce worked for a year and a half at Banff Springs Hotel, transferred to Vancouver and is employed by the company in the Parlor Car at Granville Square.

Five generations of one family whose association with the Canadian Pacific extends well over ninety years. Quite a record!

B.H. Emerson

I have not sought Mr. Emerson's permission to include his submission in my report, nor am I passing judgement on the justice or injustice of his plight. I of course recognize that he will be in receipt of Old Age Security assistance, but I do think it useful to present a concrete, although extreme example, of the feelings of many long-service employees and pensioners of the railway companies. Their plight is real—not imagery. I do not wish to embarrass Mr. Emerson by including his submission, but I do think it important that you have some appreciation for the human problem associated with small pensions in the face of rapidly escalating wages and prices.

During the course of my Inquiry, I have tried to make it clear to the thousands of pensioners in similar circumstances across Canada that I am not an Ombudsman with the power to correct the sins and errors of the past. I cannot turn back the hands of time, nor can I obliterate the economic hardships brought on by the Depression. Nor can I indemnify individuals against the consequences of decisions taken by them during the course of their employment with the railway companies. My Commission must deal with the realities of actuarial assumptions, the complexities of pension plan funding and similar highly technical problems. Many of those making representations to my Commission have little understanding of these technical problems, but they do know a great deal about the hardships and sacrifices endured during their long and faithful service to an industry so fundamental to the development and general advancement of the social, cultural, and economic well-being of Canada.

In preparing my report, I have divided it into several distinct parts, although all of them are interrelated. I have also tried to include the results of research and technical analysis in Appendices, so that the text and recommendations are largely devoid of excessive technical jargon. In this way, I am hopeful that the main body of the report will be easily understood by lay people, even though they may lack the technical knowledge required to study the Appendices in detail.

Part I

Threshold Issues

During the course of my Inquiry, I held hearings and discussions with the Canadian National Railways Limited, the Canadian Pacific Railway Company, and the Canadian Railway Labour Association in both Montreal and Ottawa. Each of these parties presented extensive submissions setting out their positions on the major issues involved. In addition, they exchanged briefs and prepared rebuttal comments and arguments for my consideration.

Much of the motivation for the Inquiry arose from longstanding dissatisfaction expressed by various groups and individuals representing pensioners, retired employees and their survivors, and so it seems appropriate and necessary that I conduct regional hearings, so that all individuals and groups could have ample and full opportunity to respond to the submissions of the principal parties and to express their own views about the history of the pension plans and their suggestions for removing perceived inequities.

Regional hearings were held in the following locations:

Vancouver, British Columbia

Victoria, British Columbia

Calgary, Alberta

Edmonton, Alberta

Regina, Saskatchewan

Saskatoon, Saskatchewan

Moose Jaw, Saskatchewan

Winnipeg, Manitoba

Thunder Bay, Ontario

London, Ontario

Toronto, Ontario

Ottawa, Ontario

Montreal, Quebec

Moncton, New Brunswick

Sydney, Nova Scotia

Formal submissions were received at these hearings and made available to any interested party who requested them. I am confident that any organization who wished to be heard had ample opportunity to present its views. As indicated earlier, I have received hundreds of letters from retired employees, relating their experiences with railway pension plans and in many cases, indicating a great deal of frustration and dissatisfaction both with the inadequacies of their pensions, their inability to receive prompt and reliable information about their pension benefits, and complaints concerning what they perceive to be arbitrary and inequitable treatment by the C.N.R. and the C.P.R. In addition, strong feelings were voiced from some sources that the C.R.L.A. has done an inadequate job of representing the interests of retired employees, their survivors and estates. The allegation is that C.R.L.A. has been more interested in immediate wage and economic gains for "active" employees and in improving potential pension benefits for future "retirers" to the neglect of currently retired pensioners.

I have also received a number of complaints from retired employees that organizations such as the Canadian Railway Employees Pensioners' Association (C.R.E.P.A.) and other associations purporting to represent their interests have been somewhat less than effective in doing so.

I will comment on some of these allegations at a latter stage, but for the moment Mr. Minister, I think it is important that you and your department, the C.N.R., the C.P.R., the C.R.L.A., and the various pensioners associations (C.R.E.P.A.) be made aware of these perceptions. Whether they are real or imaginary, they exist in the minds of individuals and will continue to exist until they are dispelled either by changes in attitudes, or by improved communications, or by changes in benefits, procedures or administration that will restore confidence in the minds of those affected. Appendix I provides a summary of the complaints received.

I do not wish to be unfair in singling out particular organizations in this regard, but one aspect of this problem cannot be ignored. It is not for me to dictate to the C.N.R., the C.P.R., nor any other interested party, how to organize themselves to meet the challenges spelled-out in my terms of reference, but the approaches taken by the C.N.R. and the C.P.R. stand in such sharp contrast that they deserve special comment.

The C.N.R. placed the responsibility for preparing its submissions, responding to those of others, and for "monitoring" the regional hearings in the hands of its Vice President for Industrial Relations, along with the managerial personnel responsible for

administering the policy and day-to-day affairs of its pension plan. During the course of the regional hearings, the C.N.R. was on all occasions represented by the Vice President of Industrial Relations, Mr. George Lach, or when he was not available, by a senior representative of their pension plan staff, either Mr. Abbe or Mr. Norman. Their presence and their detailed knowledge of the history, evolution and current pension plan provisions added considerably to the benefits derived by those attending the hearings. On many occasions after the formal hearings had adjourned, they were able to assist individuals seeking clarification of their pension benefits. Many private discussions were held between these C.N.R. representatives and those presenting submissions to elaborate on issues raised or to explain the intricacies of pension plan design and administration. Whether or not these discussions were fruitful or not I cannot say, but they at least seemed to indicate a sincere attempt by the C.N.R. to show concern and to improve communications with its pensioners.

By contrast, the C.P.R. placed such responsibilities in the hands of the Vice President of its legal department. Except for one or two occasions, the task of "monitoring" the regional hearings was assigned to a relatively junior member of the C.P.R. organization, who had neither the background nor the expertise to speak on behalf of the C.P.R. when important issues were raised. I do not imply any criticism of the individual's competence and I have no doubt that he reported events accurately and faithfully to his superiors. But it is fair to observe that his relatively junior status in the C.P.R. hierarchy, his lack of expertise in the pension field, and his general inability to speak on behalf of the C.P.R. either at the policy or administrative levels, could be interpreted by some as indicative either of a lack of interest or an unwillingness on the part of the C.P.R. to communicate with its retired employees on these matters of vital concern to them. As stated earlier, many of these individuals laboured long and faithfully in building-up the C.P.R., particularly during the Great Depression and before that, during periods of long working hours, adverse working conditions, and at relatively low wages. Rightly or wrongly, they feel neglected and badly treated by the course of economic history since their retirement.

I should add that the C.R.L.A. had on every occasion, senior representation available to explain its position to regional associations, even though it was at times subjected to some sharp criticism. Mr. Victor Clements, Co-Chairman of the C.N.R. Pension Board was also diligent in attending regional hearings, in explaining Board policy, and in showing his concern and willingness to help solve problems raised by railway pensioners.

In my opinion Mr. Minister, one of the underlying causes of this dispute is a condition that tends to affect many institutions in our complex society. As organizations grow in size and complexity and particularly when they reach the proportions of the C.N.R., the C.P.R., the C.R.L.A., and even C.R.E.P.A. itself, there is a very great danger that those at the top of such organizations and charged with the responsibility of making decisions that affect the lives of literally thousands of people and their fami-

lies, will lose sight of the real expectations, the hopes and the fears, and perhaps most importantly, the misconceptions under which those affected are labouring.

There is something very salutary and humbling in the experience of going into a relatively small community like Moose Jaw, Saskatchewan and being confronted by 200 or so railroad pensioners. They have typically spent all of their working lives in "railroading", and they did so through good times and bad (mostly the latter) with a spirit of dedication and loyalty to their employer and to Canada. They exemplify all of the virtues of hard work, independence, frugality, and self-reliance that in many segments of society have been lost sight of in recent times. They are not, by and large seeking charity; they are not looking for a "free-ride" at the expense of others. But they do feel deeply that somehow the "good life" has passed them by; that their individual and collective contribution to their employer and to Canada has been lost sight of in today's world of rapidly escalating wages, prices, and of course, the over-riding impact of inflation on their diminishing purchasing power.

Representation has been made to me that retired employees and the various pensioner groups have no status before my Inquiry. The general argument is that the Canada Labour Code deals with relations between "employers" and "employees" and between "employers" and "bargaining" agents certified to represent employees in a bargaining unit. I have examined this line of argument carefully and I find ample justification within my terms of reference to receive submissions from retired employees and various organizations purporting to represent their interests. Indeed, I do not see how I could judge the adequacy of railway pension plans, nor conduct a comprehensive inquiry, particularly as it pertains to cost-of-living indexing and to benefits for survivors of pensioners and employees, without hearing from such individuals or groups. Anyone familiar with this dispute must be aware that it was precisely the dissatisfaction expressed by retired employees and their associations that provided most of the impetus for this Inquiry. For me to deny them an opportunity to be heard would not only be ironic, but unthinkable.

Representation has also been made to me that pension plans should be removed from collective bargaining between C.R.L.A. and the C.N.R./C.P.R. and placed in the hands of some other agency. I have examined this issue carefully and I am not persuaded that those advocating such a change have a defensible position. The creation of C.R.L.A., representing as it does the collective bargaining interests of all major unions in the railroad industry, has brought about a measure of stability that is of fundamental importance to industrial relations in that industry. In more recent years, expansion of the scope of bargaining to include pension plans is, in my judgement, a logical extension of the relationship between C.R.L.A. and the C.N.R./C.P.R. That relationship is governed by the provisions of the Canada Labour Code, with adequate safeguards to ensure that bargaining procedures are conducted in a timely and constructive manner and failing that, for the imposition of sanctions when collective bargaining fails to produce a settlement. In my opinion, pension plans and related issues are properly a subject for collective bargaining and are most likely to be dealt with effectively under the Canada Labour Code.

Having said that, I hasten to add that the C.R.L.A. and to a lesser extent, the C.N.R./C.P.R. could have done a more adequate job in ensuring that the interests of retired employees are effectively represented when bargaining demands are formulated and more important, that those interests are indeed reflected in resulting collective agreements. I will return to this matter at a later stage in my report.

One final matter must be dealt with under the broad heading of "threshold" issues and that is the relationship between private pension plans and those created by governments as instruments of public policy. During the course of my Inquiry, reference was made on several occasions to the following statement, attributed to the Minister of Health and Welfare:

The C.P.P. was not set up to provide a total retirement income. Rather, it was viewed as the middle tier of a three-tiered system—Old Age Security, the Canada Pension Plan, (and) the private pension benefits and annuities. The first two components were geared to ensure adequacy, the third to provide whatever *supplementary margin of comfort* was desired. (Emphasis added). (Canadian Pension Conference, November 26th, 1973).

Spokesmen for both major railways pick up this statement in the following terms:

Thus the role of C.N.'s pension plan is to supplement the Government plans (C.P.P./Q.P.P. and O.A.S.P.)—to provide that *something extra* beyond what may be *merely adequate*. (Emphasis added).

And further:

It is important to acknowledge and accept that basic retirement income—O.A.S.P. and C.P.P./Q.P.P.—is indexed to the Consumer Price Index. What is being discussed is the indexation of the "*supplementary margin of comfort*" as the Minister of Health and Welfare described such plans as those of the railway companies. The cost of indexing the *comfort level* of retirement income is beyond the capacity of individual companies..... The purchasing power of basic retirement income—the first two tiers of retirement income—is fully protected for railway employees and for all other employees. (Emphasis added). (C.N.'s Submission No. 1).

The irony of the railway companies' position on the relationship between their private pension plans and those of governments is that railway pension plans pre-date those of government by several decades. The C.N. plan was first introduced prior to 1935 as a non-contributory plan and subsequently modified to a contributory plan. The C.P.R. plan dates back to 1903. By contrast, the Old Age Security Pension was first introduced in 1952 and the Canada Pension Plan/Quebec Pension Plan became fully effective in 1966. Historically, railway employees in conjunction with the major railway companies were attempting to provide for their retirement years long before governmental plans were initiated on a universal basis.

At first glance, it may appear to be of little significance whether one thinks of private pension plans as the third tier or as the first tier of a three-tiered system, but it is a matter of great significance when you begin thinking about the integration of the three and when you begin discussing the adequacy of total retirement income. Given the historical development of private and government pension plans, the C.R.L.A. takes the position that for the railway companies to describe their plans as *merely supplementary* to government plans is a very cynical view. The connotation that the C.N.R. and C.P.R. plans are intended to provide a *mere margin of comfort* for retired employees is rejected by the C.R.L.A. Such a connotation suggests that private plans add nothing more than a bit of frosting on the cake, with government plans providing the basic level of adequacy.

In my opinion, the railway companies made an unfortunate choice of words in describing the relationship between their plans and those of government. Clearly, employees do not forego 5 to 6% of their annual income for 30-40 years and ask their employers to match that contribution to provide a *mere margin of comfort* in their retirement years, *if* that phrase suggests that they will be only *slightly* better-off than employees in other industries who choose not to make a sacrifice in immediate purchasing power. The assumption of employees who choose to contribute to a private pension during their working lives must be that they expect to enjoy *significantly* greater purchasing power during retirement, compared with those who choose not to contribute to such plans. To reason otherwise would be to encourage employees generally to spend all that they earn immediately, with little personal regard for their future welfare and to rely wholly on government to look after them in their retirement years. I don't think that is what the Minister of Health and Welfare meant to imply in describing the relationship between private plans and the C.P.P./Q.P.P. and O.A.S.P. and I am certain that the railway companies, in picking-up the Minister's phraseology, did not intend to minimize the sacrifice in immediate purchasing power made by employees in accepting a *major* responsibility for their own retirement years. Indeed, much of the current apprehension about pension plans in general is that despite significant sacrifices in immediate purchasing power, they may not be able to deliver the kind of deferred purchasing power expected in retirement. Much of that loss can be attributed to inflation, but I am certain the railway companies would not want to destroy any of the fundamental incentive for individuals to accept a major responsibility for their own retirement years, C.P.P./Q.P.P. and O.A.S.P. notwithstanding.

PART II

DEVELOPMENT AND CURRENT STATUS OF RAILWAY
PENSION PLANS

Both the Canadian National Railways Pension Plans and the Canadian Pacific Limited Pension Plan have been amended and modified since their initial introduction. This data was provided by the respective companies in the submissions to my Inquiry.

My Inquiry is primarily concerned with the current status of the plans and the following data summarizes the plans as of January 1st, 1975.

Summary of the Canadian National
Railways Pension PlansA. *The 1959 Pension Plan*

The following is a summary of the major provisions of the 1959 Pension Plan as at January 1, 1975.

Eligibility

Membership is compulsory, after six months of service, for employees under age 60 when hired. Membership is then retroactive to date of hire.

Retirement Ages

Normal Retirement. Normal retirement age is 65. However, with the consent of the Company or Pension Board or at the initiative of the Company, a member may retire on his full accrued pension after attaining age 60, where his age and service total 85 or more.

Early Retirement. Early retirement on a reduced pension is allowed after age 55, where age and service total 85 or more.

Disability Retirement. Retirement on a disability pension is allowed with 15 years of service, if the employee is permanently disabled and is unfit to follow his usual employment with the Company.

Retirement Benefits

Normal Retirement. A monthly pension equal to the sum of the following:

(a) *For each year of service prior to January 1, 1935:* 1.5% of average monthly compensation in the last 60 months of service or in the best five consecutive calendar years, whichever is the larger.

(b) *For each year of service between January 1, 1935 and December 31, 1965:* 2% of average monthly compensation as defined above.

(c) *For each year of service after January 1, 1966:* 1.3% of that portion of average monthly compensation in the last 60 consecutive months of service up to the average of the earnings covered by the Canada/Quebec Pension Plan in the same period PLUS 2% on the portion of average monthly compensation determined in the preceding paragraph.

Compensation for determination of pensions and contributions means salary or wages, *including* overtime, and other included payments.

Effective January 1, 1975, there is a 35-year maximum accrual period.

Most employees who retired prior to January 1, 1975 have retired with benefits which are less generous than those described above. Pensions in payment have been increased approximately 2% annually each year since 1970. The C.N.R. Board of Directors, at its meeting on March 29th, 1976 approved increases in pensions effective January 1st, 1976 as follows:

<i>Retirement In</i>	<i>Pensioners Monthly Flat Rate Increase</i>	<i>Widows Monthly Flat Rate Increase</i>
1967 or Earlier	\$12.00	\$6.00
1968	11.00	5.50
1969	10.00	5.00
1970	9.00	4.50
1971	8.00	4.00
1972	7.00	3.50

These increases are the same as those granted in previous years (approximately 2%) and are estimated by the Company to cost \$2.3 million per year.

Early Retirement. The member's accrued pension is reduced by the ratio of years of service at early retirement to potential service to age 60.

Disability Retirement. The member receives his full accrued pension, based on years of service to date of disability retirement.

Late Retirement. The pension of a member who remains in service, with his consent, beyond age 65, is calculated at age 65 but is payable only after actual retirement.

Employee Contributions

Effective January 1, 1966, members contribute 5% of compensation covered by the C/QPP, and 6.5% of excess earnings. Employee contributions cease when pension units cease to accrue.

Special Provisions Applicable to Service in the United States

Benefits and contributions for service in the United States are based only on earnings in excess of those subject to Railway Retirement tax.

Termination of Employment

If the terminating employee has less than 15 years of service and is less than 45 years of age he receives a refund of his contributions plus interest.

If the employee has 15 or more years of service and is less than 45 years of age he may elect a refund, as above, or his accrued deferred pension payable from normal retirement age.

If the terminating employee had attained age 45 and completed 10 years of service, he is legally required to receive a deferred pension with respect to pensions earned or credited after October 1, 1967 and his contributions since that date may not be refunded.

The deferred pension may commence prior to age 65, under the same rules which apply to pensions on retirement.

Death Before Retirement

If the deceased employee had at least 15 years of service, his or her eligible spouse would receive one-half of the employee's accrued pension for life, but for a minimum of 10 years. The benefit is reduced if the spouse is more than 15 years younger than the employee.

To be eligible, the spouse must have married the employee at least one year before his death.

If there is no eligible spouse, the benefit may be paid to other dependents for a maximum of 10 years.

In other cases, the employee's contributions with interest will be refunded to his estate.

If the death of the employee resulted from an accident arising from his employment with the Company, the Pension Board may authorize payment of a pension of one-half of the employee's accrued pension to the surviving spouse or estate.

Death After Retirement

The pension is payable for the lifetime of the retired employee. On his death, one-half of the pension is paid to:

- (a) the surviving spouse during his or her lifetime, but for a minimum of 10 years from the date of retirement, or
- (b) his estate for a 10-year period from the date of retirement.

To be eligible, the spouse must have married the employee at least one year prior to his retirement.

B. The 1935 Pension Plan

Eligibility

Employees who were hired before January 1, 1952.

Retirement Ages

Normal Retirement. Normal retirement age is 65. An employee who has attained age 60 with at least 35 years' service may also elect to retire.

Early Retirement. There is also provision for retirement prior to age 65, on a reduced pension, under certain age and service conditions similar to those in the 1959 plan, but using a modified definition of service.

Disability Retirement. Retirement on a disability pension is allowed under certain age and service conditions, if the employee is permanently disabled and is unfit to follow his usual or other suitable employment with the Company.

Contributions

Employee. After an employee has completed 10 years of service, he may elect to contribute to provide a supplemental annuity. He may contribute any integral percentage up to 10% of his earnings. Such contributions are made to the Annuity Trust Fund which forms part of the 1959 Pension Trust Fund.

Company. The Company will contribute on his behalf an equal amount, up to 5% of his earnings.

Contributions During First 10 years. In the first 10 years of service an employee may make contributions on the same basis to provide a further supplemental annuity, which will be provided from the Supplemental Annuity Trust Fund. The Company does not make a corresponding contribution.

Retirement Benefits

At normal retirement date an employee will receive the amount of supplemental annuity which may be provided, on the basis of actuarial tables, by the accumulated value, with credited interest to retirement, of his and the Company contributions on his behalf, as described in the previous section.

In addition, employees in the service of the Company on January 1, 1935, who were hired before age 50, and employees who joined the Company after January 1, 1935 but before age 45, receive a basic pension of \$300 per annum (\$25 per month), provided at the sole expense of the Company. If the employee was in service on January 1, 1935, had more than 10 years' service at that date, and was hired before age 50, his pension shall be not less than 1% of his average salary in the best 10 consecutive years prior to January 1, 1935, multiplied by his years of service to December 31, 1934.

Minimum Pension. There is a minimum pension provision applicable to employees who were in the service of the Company on January 1, 1935, which provides that the amount of pension, determined as above, but assuming that the employee contributed to his supplemental annuity at the rate of 5% of his earnings during their entire period he was eligible to do so, will be not less than 1% of his average earnings in the 10 years prior to his retirement, multiplied by his years of service at retirement.

Maximum Pension. The pension provided by all contributions made by the Company on behalf of the member will not exceed 40% of the member's average salary in his best 10 consecutive years of service, except that the limitation does not apply where the pension would be less than \$600 per annum.

Termination of Employment

An employee who has not attained age 45 and completed 10 years of service at his date of termination will receive a refund of his own contributions with credited interest.

An employee who had attained age 45 and completed 10 years of service will receive a deferred supplemental annuity, if any, provided by the accumulated value of the employee's contributions up to 5% of his earnings on and after October 1, 1967,

and by the corresponding Company contributions on his behalf. He receives a refund of the balance of his contributions, if any, with interest. In addition, if the employee entered service before age 45, he will receive a deferred pension of \$15 per year for each year of service on and after October 1, 1967, to a maximum of 20 years (\$300 per annum).

Death Before Retirement

In the event of the death of an employee before retirement, his contributions, if any, with credited interest, will be paid to his estate.

However, if the employee met certain age and service conditions, the Pension Board *may*, at its sole discretion, authorize a pension to the spouse, if the spouse was married to the employee at least three years prior to the employee's death, equal to the amount which may be provided by the employee's contributions with interest and by one-half of all the Company's contributions made on the employee's behalf (other than amounts with respect to the Minimum Pension). The pension would be payable for the lifetime of the spouse, and payable for a minimum of 10 years.

If the death of the employee resulted from an accident arising from his employment with the Company, the Pension Board *may* authorize payment of a survivor benefit, as calculated above, to the employee's spouse or estate.

Death After Retirement

The normal form of pension is payable only for the lifetime of the retired member. In some cases, a retired member may elect an optional form of pension of equivalent value, such as a reduced pension payable for his lifetime but guaranteed for a stated number of years, or a joint and survivor annuity.

Summary of the Canadian Pacific Limited Pension Plan

The following is a brief summary of the major provisions of the Canadian Pacific Limited Pension Rules and Regulations, as at January 1st, 1975.

Eligibility

Normally, only employees hired before age 40 are eligible (exceptions are employees transferred from a subsidiary company of other special circumstances).

Participation is compulsory from date of hire, for employees included in collective agreements. Participation is voluntary for all other employees, who may join the plan at any time within the first year of employment.

Retirement Ages

Normal Retirement. Normal retirement age is 65. However, with the consent of the Company, a member may retire on his full accrued pension after attaining age 60 provided he has 25 or more years of service.

Disability Retirement. A disabled employee may retire on his full accrued pension if he has 15 or more years of service and the sum of his age plus service, total 60 or more.

Retirement Benefit

A monthly pension equal to the sum of the following:

(a) *For each year of service prior to January 1, 1937:* 1½% of average monthly compensation in the last 60 months of service or in the best five consecutive calendar years, whichever is the larger.

(b) *For each year of service between January 1, 1937 and December 31, 1965:* 2% of average monthly compensation as defined above.

(c) *For each year of service after January 1, 1966:* 1.3% of that portion of average monthly compensation as defined above which does not exceed the average earnings covered by the Canada/Quebec Pension Plan in the same period. PLUS 2% of that portion of average monthly compensation as defined above which exceeds the average earnings covered by the Canada/Quebec Pension Plan in the same period.

Effective January 1, 1975, there is a 35-year maximum benefit accrual period.

Most employees who retired prior to January 1, 1975 have retired with benefits which are less generous than those described above. In 1971 and again in 1973, certain improvements were made to the pensions for existing pensioners and survivors. Effective July, 1971 the benefit rate was raised from 1¼% to 1½% for all service after January 1st, 1956, with the retention of the integration with C.P.P./Q.P.P. Provision was also made for vesting of benefits after 15 years of service. The 35 years of service required for disability and widow's allowance was reduced to 15 years of service where age plus service totalled 60.

In 1973 the benefit rate was increased to 2% of pay for all service after January 1st, 1956. It should be noted however, that no increased benefits have been made to pensioners under the C.P.R. plan similar to those made under the C.N.R. plan from 1970 to the current year.

Eligible employees on December 31, 1936 who did not become contributors receive a monthly pension of 4/5% of average monthly pay in the 10 years prior to January 1, 1937 for each year of service prior to that date, subject to a minimum of \$35 per month, and proportionately less if the employee had less than 25 years of such service.

Employee Contributions

Effective January 1, 1966, members contribute 4.42% of compensation covered by the Canada/Quebec Pension Plan, and 6% of excess earnings. Employee contributions cease when pension units cease to accrue.

Eligible employees could elect not to contribute on January 1, 1937. Contributors had an option to cease contributions on December 31, 1965.

Special Provisions Applicable To Service in the United States

Benefits and contributions for service in the United States are based only on earnings in excess of the earnings on which a pension is granted under the Railroad Retirement Act or the Social Security Act of the United States.

Termination of Employment

If the terminating employee has less than 15 years of service, he receives a refund of his contributions *without interest*, except that if the member has five or more years of service and his termination is *involuntary*, he receives a refund of his contributions *with interest*. Interest is at the rate of 3% per annum, and accrues from July 1, 1971.

If the employee has 15 or more years of service, he may elect to receive his accrued deferred pension payable from age 65, or a refund as described above.

If the terminating employee had attained age 45 and completed 10 years of service, he may not receive a refund of contributions made after September 30, 1967 but is required to receive a deferred pension with respect to benefits earned or credited after September 30, 1967.

Death Before Retirement

If the deceased employee had at least 15 years of service and the sum of his age plus service total 60 or more, a pension of one-half of his accrued pension is payable to his eligible widow (or to the dependent widower in the case of a deceased female employee), for life or until re-marriage. The benefit is reduced if the survivor is more than 10 years younger than the employee.

To be eligible, the survivor must have married the employee at least five years before the employee's death. No survivor benefit is payable in respect of terminated members entitled to deferred pensions if they die prior to retirement.

If no survivor benefit is payable, the employee's contributions with interest will be refunded to his legal representatives.

Death After Retirement

The pension is payable for the lifetime of the retired employee. On his or her death, one-half of the pension is payable to an eligible widow or dependent widower, for the lifetime of the survivor, or until re-marriage.

To be eligible, the survivor must have married the pensioner at least five years prior to the earlier of his retirement date or his 65th birthday.

Pension payments are subject to a minimum guarantee of a return of the member's contributions.

Employers of Canadian Pacific Express Limited participate in a separate, but identical plan as that of the C.P.R. Employees of C.P. Transport Limited (Western Division) are in the C.P.R. Pension Plan, since they are in fact employed by C.P.R. The Dominion Atlantic Railway Company, the Esquimalt and Nanaimo Railway Company and the Quebec Central Railway each form part of the C.P.R. system. Their employees are employed by C.P.R. and as such, are members of the C.P.R. pension plan.

Part III

**COMPARISON OF RAILWAY PENSION PLANS WITH
PUBLIC SECTOR PLANS AND SELECTED PRIVATE
SECTOR PLANS**

Under my terms of reference, I am asked to compare railway pension plans *in all their aspects* with those of the Public Services, Crown Corporations and *like* plans of relevant employers in the private sector. At first glance, this would appear to be a relatively easy task, but such is not the case. There are particular dangers inherent in trying to examine one aspect of employee benefits in isolation from all others. Total benefits derived from one's employment is a very complicated mix consisting of economic and non-economic benefits. Employees both individually and collectively may opt for a lower level of economic benefit in order to achieve what they believe to be a greater non-economic benefit. Similarly, with the "package" of economic benefits, one group of employees may opt for higher immediate gains in the form of wage increases and may therefore accept a lower level of deferred income in their pension plan. And within pension plans, one group may place a higher priority on provisions for early retirement; another group may opt for some other form of equivalent.

For these and other reasons, comparisons must be carefully planned and their results must be interpreted with caution. The comparative analysis in the public sector was accomplished by examining pension plans in the Federal Civil Service, the Canadian Armed Forces, the Provincial Civil Service in Ontario, Quebec, and British Columbia, Air Canada, the Hydro Electric Power Commission of Ontario, the City of Montreal, and the City of Winnipeg.

To assist me in my comparison of plans in the private sector, the C.N.R., the C.P.R. and the C.R.L.A. provided a list of 43 of the largest employers in Canada. A number of these would not be appropriate for comparative purpose because for example, some had only a small percentage of unionized employees, or because of the nature of the industry, they employ a mix of skills vastly different from the railway companies, or the industry operated more on a regional than on a national basis. In the final analysis, thirteen corporations representing the following industry groups were used for comparison in the private sector: Iron and steel, non-ferrous metals, mining, manufacturing, pulp, paper and lumber, transportation, and utilities.

The total of 22 pension plans (9 from the public sector and 13 from the private sector) provided a good cross-section against which the railway pension plans were compared.

In Schedule A of the Terms of Reference, specific reference is made to the following twelve companies:

Canadian National Railways

Canadian Pacific Limited

Canadian Pacific Transport Limited (Western Division)

Dominion Atlantic Railway Company

Esquimalt Nanaimo Railway Company

Northern Alberta Railways Company

Quebec Central Railway Company

Algoma Central Railway Company

Toronto Hamilton and Buffalo Railway Company

Toronto Terminals Railway Company

Shawinigan Falls Terminal Railway Company

Canadian Pacific Express Limited

Canadian National Railways and Canadian Pacific Limited are by far the two largest companies and they each have a separate pension plan. Employees of Canadian Pacific Transport Limited (Western Division), Dominion Atlantic Railway Company, Esquimalt Nanaimo Railway Company and Quebec Central Railway Company participate in the Canadian Pacific Pension Plan. Canadian Pacific Express Limited has a separate plan which is identical to that of Canadian Pacific Limited. Employees of the Shawinigan Falls Terminal Railway Company participate in the Canadian National Pension Plan.

Three of the remaining companies have separate pension plans which are patterned after the Canadian Pacific Plan. These companies are Northern Alberta Railways Company, Toronto Hamilton and Buffalo Railway Company, and Toronto Terminals Railway Company. Algoma Central Railway Company operates a separate pension plan.

Essentially then the employees of the twelve companies belong to seven different pension plans. In terms of membership, the plans of the two major railway companies dominate the sample. Furthermore, most of the other five plans have benefit patterns

similar to that of the Canadian Pacific Pension Plan. Consequently, the analysis will concentrate for the most part on the pension plans of the two major railway companies.

Before discussing the actual analysis, some further comments on the subject of pension plan comparisons will be useful. As already noted, pension benefits represent but one item in the total compensation package. Some employers (and employees) place greater emphasis on pension benefits than others. Nevertheless, since the pension benefits form such an important item, it is a worthwhile exercise to compare them if certain modifications are made to the comparison. Such modifications include the treatment of survivor's benefits and disability benefits. These benefits are provided through a number of pension plans. However, in many cases death benefits are provided through a separate group life arrangement.

In the same way, disability benefits, to cover an extended period of disability, are provided through an insured long-term disability plan. As far as these benefits are concerned it would be inappropriate to concentrate just on the benefits provided through the pension plan and thus benefits from these two other sources have been included. Similarly, where retirement income is provided through a pension plan and a deferred profit sharing arrangement, both must be taken into account for comparison purposes.

An exhaustive analysis was made of all the plans in the sample group since the Terms of Reference indicated that the plans were to be compared in all their aspects. However, it was decided that it would be appropriate to concentrate on the more important features of the plans. Consequently, two matrices were prepared comparing the railway plans with the nine public sector plans and the thirteen private sector plans. The matrices are given at the end of this section. It is felt that these provide a useful way of comparing the plans. The wording in the various cells is of necessity abbreviated, and hence the accompanying narrative forms an essential part of the comparison. The matrix presentation permits one to quickly establish how certain features of the railway plans compare with the corresponding features of the other plans. Although some plans put more emphasis on certain features than others, it is felt that if this approach is followed for all the main features, useful conclusions can be drawn.

Comparison of Railway Pension Plans with Public Sector Plans

Eligibility

The public pension plans examined are similar to the railway pension plans in that they cover full-time employees and in that membership is compulsory. The rules of the Canadian Pacific plan do not permit a new employee who is 40 years of age or over to join the plan. This provision dates from 1937 when the present Canadian Pacific plan was implemented. Restrictions of this nature are at variance with common practice in the plans studied.

Employee Contributions

The level of employee contributions cannot be analysed in a meaningful way unless some reference is made to the level of benefits. However, the retirement benefits provided by the nine plans are quite similar, apart from the important questions of indexing and early retirement provisions. All the plans considered here aim at providing a total benefit of around 70% of final average earnings to a career employee. This 70% includes to some extent the benefits payable from the Canada Pension Plan.

The average level of employee contributions is 6.28%, less the employee's contribution to the Canada Pension Plan. All the plans take account of the fact that the employees contribute to the Canada Pension Plan on a certain band of earnings. The contributions to the employer plan are somewhat reduced over this range. If no allowance were made for the fact that employees have to contribute to the government plan, the lower-paid employees would be contributing higher percentage amounts of salary.

The contributions to the Railway Pension Plans straddle the average of public plans but are both quite close to it. The provisions of the Canadian National plan are and have been more liberal than those of the Canadian Pacific plan and the respective contribution rates are 6½% and 6% of earnings (less the contribution to the Canada Pension Plan). In view of the fact that five of the plans in the public sector group provide full cost-of-living increases to retired members, the employee contributions to the Railway Plans are relatively high. However, although the typical contribution to a fully-indexed plan is 7% (less CPP) there is provision in many of these plans for the employee contributions to rise in the future to meet the cost of indexation. The magnitude of these increases will depend to a large extent on the future rates of inflation.

The present analysis does not attempt to compare the employer contributions. In most of these plans the employer contribution represents the balance of the cost of the benefits not provided by the employee contributions. The level of the employer contributions at any given time depends on historical funding practices, the experience of the fund, current funding practice and actuarial assumptions used. The employer contributions in connection with the railway plans are discussed later on in this report.

Retirement Age and Service Conditions

The typical retirement age for the group of nine plans is age 65. However, there is an increasing tendency to permit retirement at some earlier age (60 say) if a certain period of service has been completed. In these cases the accrued pension is payable from the actual date of retirement without any actuarial reduction. (The accrued pension usually represents the employee's pension calculated for normal retirement, but based on his (or her) service and earnings to the date of actual retirement.) In this connection, the fact that the Canada Pension Plan benefits do not become payable until age 65 causes problems. This is because the pension produced by the formula makes an allowance for the Canada Pension Plan benefit by calculating benefits on earnings up

to the Year's Maximum Pensionable Earnings (YMPE) at 1.3% per year of service. Together with the actual Canada Pension Plan retirement benefit this produces a total benefit which approximates 2% per year of service. However, when an employee retires before age 65 there is a gap until age 65. Most of the plans surveyed in this group provide an additional amount of pension to "bridge" this gap. From the employees' point of view, this is a most welcome benefit and the Railway Pension Plans are less liberal in this respect than most of the nine plans considered in this sample.

Early Retirement

As far as early retirement is concerned, considerable variation is exhibited by the plans in the sample. The key factors to consider are the eligibility conditions such as age and service requirements and the degree to which the formula pension is reduced in transforming it from a pension payable from age 65 to pension payable from the date of actual retirement. Both railway plans provide an immediate pension from age 60 without any actuarial reduction if the employee has completed at least 25 years' service. In addition, the Canadian National plan provides for a reduced pension to become payable from age 55 if the employee's age and service totals at least 85. The most generous early retirement provisions are contained in the Federal Public Service plan.

Type of Plan and Earnings Base for Pension Calculations and Benefit Rate

All the public plans considered use a formula based on final average earnings multiplied by years of service for calculating retirement pension. In five of the plans the average is taken over the best 5 consecutive years. The Federal Civil Service and the Canadian Armed Forces plans use a 6-year averaging period, while the City of Montreal uses 3 years and the City of Winnipeg, 10 years. Both railway plans use a 5-year period, and they compare favourably with the other plans in this respect. In some of the plans the formula uses the best 5 years, while in others the formula used the last 5 years. This distinction has normally no impact on an employee's benefits and hence has been ignored in this analysis. Another difference relates to the integration procedure with the Canada Pension Plan. Both railway pension plans use a 5-year period in calculating the band of final earnings on which pension benefits are calculated at the 1.3% rate per year of service. The Federal Public Service plan uses a 3-year period and is thus less generous in this regard since the 3-year average results in a higher fraction of earnings attracting the 1.3% rate and hence a lower fraction at the 2% rate. Practice varies among the other plans. British Columbia uses the Year's Maximum Pensionable Earnings during the year prior to retirement, and Ontario is similar to the railway pension plans. The accrual rate of pension benefit works out at around 2% per year of service for 8 of the 9 plans. The City of Montreal has an accrual rate of 2.5% of final earnings for each year of service. The benefit formulas for retirement income used in the railway plans are clearly in keeping with those used in the other plans considered here.

Post-Retirement Increases

As indicated earlier in this report, the matter of post-retirement increases is of considerable concern to existing railway pensioners. In 5 of the plans considered, pensions are escalated in line with percentage increases in the Consumer Price Index. These plans comprise those of the Federal Public Service, the Canadian Armed Forces, and the Provincial Civil Service of British Columbia, Ontario and Quebec. As mentioned earlier, the additional employee contribution in respect of this type of indexing tends at present to be around 12% of earnings. However, most of the plans contain provision for additional future increases in employee contributions. The benefit increases under the Ontario Civil Service plan are limited to 8% in any one year.

From the viewpoint of the retiring employee, full cost-of-living indexing is clearly of great benefit. It means that his pension will not decline in real terms over the remainder of his lifetime, thus providing real security. The 5 plans which provide this benefit derive their revenues from taxation and are in a vastly better position to guarantee this type of benefit than a company operating in the private sector. The potential liabilities incurred are enormous, and as a consequence retired employees form two separate classes: the fortunate class, principally government employees, enjoy a fully indexed pension, whereas the other class, consisting mainly of private sector employees, do not. Naturally, all employees would like a fully indexed pension. Railway employees in particular, because their work is so essential to the national well-being, look with envy at the indexed pensions provided for civil servants.

It would also appear that the public at large is unaware of the tremendous additional liability incurred when a plan is fully indexed. This liability may not be reflected in the initial cost if the plan is funded on a pay-as-you-go basis, as many government plans are.

Three of the remaining plans considered have granted ad hoc increases in recent years to retired employees. The City of Montreal has a higher initial level of pension than the other plans, which compensates to some extent for the lack of indexing. Canadian National has granted ad hoc increases to retired employees since 1970. However, they fall short of the full indexing provided by the Civil Service plans.

It is evident that Canadian Pacific pensioners fare poorly in this comparison. No Cost-of-living increases have been granted to current pensioners.

Survivor's Benefits - Death in Service

All the 9 plans surveyed in this group provide a survivor's pension of 50% of the deceased employee's accrued pension. The most usual eligibility condition is the requirement that the deceased employee have completed 10 years' service. Since the benefit is small for short-service employees this restriction is not so serious as would appear at first sight. The Department of National Revenue Taxation rules governing

pension plans effectively limit the amount of the survivor's pension to the accrued Circular 72-13R3, dated December 1, 1975, states on page 9:

"(f) Dependents' Pension Benefits - A pension plan may provide for a reasonable pension to a spouse (including common-law) or to a parent, brother, sister or child at the time of the member's death. The amount of the pension must be directly related to (but must not exceed) the accrued entitlement of the employee at date of death except that a reasonable and moderate minimum pension may be provided, subject to a specified period of eligible service. As an example, a pension to a spouse of 60% of the amount of pension accrued to the employee at date of death, with provision for actuarial adjustment if the spouse is more than ten years younger than the employee, would usually be considered to be a reasonable pension."

The two railway plans provide survivor's benefits of 50% of accrued pension and thus are identical in this respect with the 9 public plans. However, the railway employees require 15 years' completed service before becoming eligible for this benefit whereas the norm for the group is 10 years. In the event that an employee dies before completing the necessary period of service to qualify for a survivor's pension, the death benefit in the case of the 9 public plans normally consists of a refund of contributions with interest. Similar provisions exist in the railway plans.

Many pension plans require that the employee and his spouse must have been married for a certain number of years before the employee becomes eligible for a spouse's benefits. In the case of the Canadian National plan the employee must have been married for at least one year and in the case of Canadian Pacific for at least 5 years. The thrust of such restrictions is presumably to prevent so-called death-bed marriages, and it would appear that restrictions of this nature are becoming more liberal. In 5 of the 9 plans the survivor's pension continues for the duration of the spouse's life. Under the rules of the Canadian National plan, the survivor's pension is for life, whereas under the Canadian Pacific rules it ceases on the remarriage of the surviving spouse.

Group Life Insurance Benefits

The level of benefits provided under the various group life insurance arrangements ranges from one to three times salary. The cost-sharing pattern under these arrangements varies. In a number of cases the employer provides a basic amount of benefit, leaving the employee the option to supplement this coverage at his own expense. The benefit of \$7,000 provided for a railway employee appears light when compared with the other employee groups. This lack of coverage is particularly significant in view of the 15-year qualifying period for a survivor's pension. It should be mentioned that the cost of the life insurance benefit in the case of the railway employee is met by the companies.

Survivor's Benefits - Death After Retirement

The most common benefit consists of a survivor's pension of 50% of the retired employee's pension, with one or two plans having no automatic survivor's pension. In these cases the member can choose from a range of options, some of which provide for a continuing pension to the survivor. Such an arrangement is generally not as valuable as the provision of an automatic survivor's pension which involves no reduction in the retired member's pension. The railway plans provide this more valuable benefit and compare well with the group as a whole. The Canadian National survivor's pension is payable until death, whereas the Canadian Pacific benefit is payable until death or remarriage. In this regard the Canadian National provisions are more liberal than the average, whereas the Canadian Pacific provisions are more typical of the group as a whole.

Once again, the question of cost-of-living increases assumes great importance. Although the railway plan benefits compare favourably with the others from the viewpoint of initial benefit, the fact that a number of the other plans have pensions which increase in line with increases in the Consumer Price Index makes these benefits considerably more valuable. This is particularly the case with regard to survivors' pensions. Women tend to live longer than men and also tend to marry men older than themselves. Consequently, these pensions can continue in payment for up to 30 years from the date of the employee's retirement.

In a number of the plans there is also provision for additional children's pension benefits in the case of death after retirement. Such provisions are not included in the railway plans.

Disability Benefits

As is the case with survivor's benefits, disability benefits can be provided through the pension plan and through a separate insured arrangement. A number of employers utilize both methods.

Dealing first with the pension plan, one can see from the matrix that 8 of the 9 plans provide a disability pension equal to the member's accrued pension. The B.C. Civil Service uses the member's projected service to age 55, and this tends to be more generous than using the member's accrued service. The railway plans provide a disability pension equal to that provided by 8 of the 9 plans considered. However, the service conditions tend to be less restrictive in the 9 public plans than in the railway plans. Thus 6 of the plans provide a disability pension if an employee has at least 10 years' service. In the Federal Civil Service an employee who has at least 5 years' service is covered. In the remaining 2 plans the service requirement is similar to that of the railway plans, namely 15 years. The Canadian National plan is somewhat more liberal than the Canadian Pacific plan in this regard, since under the latter there is the additional proviso that age plus service must total at least 60.

In these comparisons, no attempt is made to analyse variations in the different definitions of disability. Additional disability benefits are currently provided through separate disability plans in the case of 4 of the plans, and the City of Winnipeg is implementing a new plan. In the insured, long-term disability plans, two important qualifications should be stressed. The cost-sharing arrangements under the different plans vary. In addition, the tax status of the benefits in the hands of the employee varies from plan to plan.

The benefit levels have not been modified to take account of these points. It would appear that for the range of long-term disability plans considered, benefit levels run from 50 to 75% of earnings and that the employer often shares the cost. The benefits payable under government plans are normally offset to some extent by benefits payable under government plans (such as the Canada Pension Plan and Workmen's Compensation) and the benefits (if any) from the employer pension plan. This type of plan is often underwritten by an insurance company, and if cost-of-living increases to the beneficiaries are included, these are normally limited to 2 or 3% in any one year.

Termination Benefits

These benefits are perhaps the most difficult of all to analyse and compare for a number of reasons. On looking at the matrix, the reader may see this statement as paradoxical. There appears to be a well-established hierarchy of benefits:

Refund of own contributions

Refund of own contributions with interest

Choice of refund of own contributions with interest or equivalent deferred pension

Choice of refund of contributions with interest or deferred pension calculated on accrued service and earnings to date of termination

Compulsory vesting. Usually deferred pension based on accrued service and earnings to date of termination.

To the layman, this order (or something similar) is usually accepted as being the correct one. However, in many cases the value of the benefits need not follow this order. In a contributory plan it may well be that a refund of the member's contributions is at least as valuable as a deferred pension calculated on the member's accrued service. This is particularly the case for younger employees.

Another important aspect of termination benefits is the treatment of deferred pensions with regard to cost-of-living indexing. In some plans deferred pensions are increased at the same rate as current pensions. Hence, the accrued deferred pension is a much more valuable benefit in these cases.

From an inspection of the matrix it is clear that the normal termination benefit consists of a refund of contributions (usually with interest) for withdrawing employees who have up to 10 years' service. After 10 years' service a deferred pension is usually available. It may be compulsory or optional. In many plans, employees who have reached at least age 45 and completed a minimum of 10 years' service must by law be granted a deferred pension.

In the railway plans, an employee must have completed at least 15 years' service to obtain a deferred pension, unless he qualifies under the "45 + 10" rule. The Canadian National plan adds interest to the contributions if the employee has completed one year's service. In the case of the Canadian Pacific plan, interest is added if the termination is involuntary and the employee has 5 or more years' service.

Summary

The most important difference between the public pension plans and the two railway plans relates to the cost-of-living increases granted to existing pensioners. Five of the public plans provide full indexation of current pensions. The ad hoc increases provided by Canadian National are in line with the increases provided by 3 of the remaining 4 plans. Although one of these 4 plans did not provide cost-of-living increases, it had an unusually high benefit accrual rate. In this connection, the Canadian Pacific pension plan differs significantly from the group since it has not as yet provided cost-of-living increases to current pensions.

The initial levels of retirement income and the initial levels of survivor's benefits provided under the railway plans are very similar to those provided under the other plans. However, the eligibility conditions are somewhat more stringent under the railway plans: 15 years as compared to 10. Nearly all the plans provide a disability pension equal to the member's accrued pension. Here again, the qualifying period under the railway plans is 15 years as compared with 10 years in the case of most of the other plans. The railway employees have less group life coverage than the average for the group. The members of a number of the other plans are also covered under separate long-term disability plans which do not exist in the case of the railways.

In many respects the railway plans are very similar to the public plans. However, there are, as mentioned above, a few important areas where the public plans provide superior benefits.

Comparison of Railway Pension Plans with Private Sector Plans

The 13 private sector plans show considerably more variation in terms of design and benefit levels than the 9 public sector plans. It is thus more difficult to establish what represents the *norm* for a particular feature or benefit level. For example, the

sample includes contributory and non-contributory plans. It also includes final average, career average, and flat benefit plans. These types of variation make the task of comparing the plans more difficult.

The analysis is carried out in the same way as in the case of the public service plans. The detailed comparison matrix is given at the end of this section. For simplicity the details given in the matrix are brief, and thus the accompanying narrative forms an essential part of the comparison since it amplifies certain points and indicates where important qualifications must be made.

Just as in the comparative analysis of public sector plans, this comparison includes death benefits and long-term disability benefits which are provided outside the pension plan.

Eligibility

The private plans surveyed tend to cover full-time regular employees and are most often compulsory. In these respects they are similar to the railway pension plans. The Canadian Pacific plan is at variance with common practice in the private sector with an upper age limit of less than 40 years of age for new entrants to the plan.

Employee Contributions

The distribution of the levels of employee contributions among the 13 plans considered is as follows:

<u>Employee contribution</u>	<u>Number of plans</u>
Non-contributory	3
2%	1
3 1/3%	1
4%	2
4 1/2%	1
5%	4
6%	1

The 2% contribution rate refers to Company K. In this case, the actual pension plan is non-contributory. However, employees contribute to a separate deferred profit-sharing arrangement. Although the contribution rate is 5% of earnings, it is more reasonable to use a figure of 2% since the maximum employee contribution in any one year is \$200. On a salary of \$10,000, the \$200 limit represents a 2% contribution rate. In the case of all the other contributory plans, the contribution rates make an allowance for the employee contributions to the Canada Pension Plan. The rates quoted above are those which apply to that band of earnings in excess of the Year's Maximum Pensionable Earnings. The corresponding contribution rates for Canadian National

PENSION PLAN COMPARISON

	Canadian National Railways	Canadian Pacific	Federal Public Service	Province of Ontario	Province of B.C.	Province of Quebec	Canadian Armed Forces	Aut. Canada	Ex. Canada	Ex. U.S.	U.S. - Other	U.S. - Total
ELIGIBILITY												
- minimum age	60	40	N/A	N/A	N/A	N/A						
- maximum age												
- service conditions												
- complicity												
EMPLOYER CONTRIBUTIONS	3% up to YMPE*	4.43% up to YMPE	1% less employer contribution to CPP	2% less employer contribution to CPP	3% up to YMPE	6.6% less employer contribution to Quebec Pension Plan	3% less employer contribution to CPP	4.43% up to YMPE	10% less employer contribution to Quebec Pension Plan	3.433% up to YMPE	5.00% over YMPE	
as a percentage of earnings	6.6% over YMPE	6% over YMPE		6-12% over YMPE			6% over YMPE	10% over YMPE				
RETIREMENT AGE AND SERVICE CONDITIONS												
- early	Age 65	Age 65	Age 60 with 5 years' service	Age 65	Age 65	Age 65	Age 65	Age 65	Age 65	Age 65	Age 65	
	Age 60, if age plus service is at least 65, accrued pension payable. Age 55, if age plus service is at least 65, reduced pension payable.	Age 60 with at least 25 years' service, accrued pension payable	Age 65 or 20 years' service, accrued pension payable	Age 65 or 20 years' service, accrued pension payable	Age 65 or 20 years' service, accrued pension payable	Age 65 or 20 years' service, accrued pension payable	Age 65 or 20 years' service, accrued pension payable	Age 65 or 20 years' service, accrued pension payable	Age 65 or 20 years' service, accrued pension payable	Age 65 or 20 years' service, accrued pension payable	Age 65 or 20 years' service, accrued pension payable	
- hedge benefit	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	
RETIREMENT BENEFIT												
Type of plan	Final average	Final average	Best average	Best average	Best average	Final average	Best average	Best average	Final average	Final average	Best average	
Benefits base for pension calculations	Best 5 consecutive years	Last 5 years	Best 6 consecutive years	Best 5 consecutive years	Best 5 consecutive years	Last 5 years	Best 6 consecutive years	Highest consecutive 5 years	Last 10 years	Last 10 years	Best 5 years	
Benefit rate per year of service	Up to YMPE Over YMPE	1.7% 2.4%	1.2% 2.0%	1.3% 2.0%	1% 0%	1% 0%	1.3% 2.0%	1.3% 2.0%	1.4% 2.0%	1.3% 2.0%	1.3% 2.0%	
POST RETIREMENT INCREASES												
	Ad hoc increases in recent years	N/A	Pensions indexed to the Consumer Price Index	Pensions increase with Consumer Price Index Maximum increase 2% p.a.	Pensions indexed to the Consumer Price Index	Pensions indexed to the Consumer Price Index	Pensions indexed to the Consumer Price Index	Ad hoc increases in recent years	Ad hoc increases in recent years	N/A	Ad hoc increases in recent years	
SURVIVOR'S BENEFITS												
Death in service	50% accrued pension	50% accrued pension	50% accrued pension plus children's benefits	50% accrued pension	50% of projected pension based on 25 years' service	50% of accrued pension plus children's benefits	50% of accrued pension plus children's benefits	50% accrued pension plus children's benefits	50% accrued pension plus children's benefits	50% accrued pension plus children's benefits	50% accrued pension plus children's benefits	
Amount of pension			15 years' service and age plus service exceeds 60	10 years' service	10 years' service	10 years' service	10 years' service	10 years' service	10 years' service	10 years' service	10 years' service	
Conduits	Employee must have 15 years' service	Death or remarriage	Death or remarriage	Death or remarriage	Death or remarriage	Death	Death	Death	Death	Death	Death	
Persons remain on survivor's												
Group Life Benefits	\$7,000	\$7,000	1 month*	Greater of \$7,500 and 75% salary	2-25 x salary max \$25,000	\$5,000 plus 1/4 salary for administrative expenses	Survivors' income benefit payable	2% x annual pay	1-2 x salary	\$2,000 + union plan	1.3 x salary	
Death after retirement	50% of member's pension	50% of member's pension	50% of member's pension plus children's benefits	50% of member's pension	None	50% of member's pension with child ren's benefits	50% of member's pension plus child ren's benefits	50% of member's pension	No automatic pension	40% of member's pension plus children's benefits	30% of member's pension	
Pension benefit cases on survivor's	Death	Death or remarriage	Death or remarriage	Death or remarriage	Death or remarriage	Death	Death	Death	Death	Death or remarriage	Death or remarriage	
DISABILITY BENEFITS												
Pension benefits	Accrued pension	Accrued pension	Accrued pension	Accrued pension	Pensions based on service projected in age 55 minus 25 years	Accrued pension	Accrued pension	Accrued pension	Accrued pension	Accrued pension	Accrued pension	
Age/service conditions	15 years' service	15 years' service	5 years' service	10 years' service	10 years' service	10 years' service	10 years' service	15 years' service and age plus service is at least 55	15 years' service	10 years' service	10 years' service	
Long term disability benefits	N/A	N/A	75% of earnings	66-2/3% of earnings	N/A	N/A	75% of earnings	65% of firm \$7,200	Plan being implemented	N/A	N/A	
TERMINATION BENEFITS												
(at 5 or 10 year intervals)												
0-10 contributions refunded	0-5 contributions refunded	0-5 contributions refunded	0-10 contributions with interest	0-10 contributions with interest	0-10 contributions with interest	0-10 contributions refunded	0-10 contributions refunded	0-10 contributions with interest	0-10 contributions with interest	0-10 contributions with interest	0-10 contributions with interest	
1-15 contributions with interest refunded	5-15 contributions with interest refunded	5-15 contributions with interest refunded	10 to 45+10 choice of contributions with interest or refund of contributions with interest	10 to 45+10 choice of contributions with interest or refund of contributions with interest	10 to 45+10 choice of contributions with interest or deferred pension	10-10 choice of contributions or deferred pension	10-10 choice of contributions or deferred pension	10 to 45+10 choice of deferred pension or refund of contributions with interest	10+ deferred pension or refund of contributions with interest	10+ deferred pension or refund of contributions with interest	10+ choice of deferred pension (complete vesting) or refund of contributions with interest	
15+ deferred pension available	15+ deferred pension available	Age 45+10 deferred pension (compulsory vesting)	Age 45+10 deferred pension	Age 45+10 deferred pension	Age 45+10 deferred pension	20+	20+	20+	Age 45+10 deferred pension compulsory by law	Age 45+10 deferred pension compulsory by law	Age 45+10 deferred pension compulsory by law	
Age 45+10 years' service compulsory vesting	Age 45+10 years' service compulsory vesting											

*YMPE denotes the Year Maximum Payoutable Earnings for the purposes of the Canada Pension Plan

are 6 1/2% and for Canadian Pacific, 6%. Clearly the rates in the railway plans are significantly higher than the majority of rates in operation in the 13 private sector plans. As against this, the railway plans provide better benefits - a factor which has to be taken into account in evaluating the significance of this difference.

Retirement Age and Service Conditions

The normal retirement age in all the private plans considered was 65, and this is also the normal retirement age in the case of the railway plans. In many of the plans there is a provision whereby a member can retire early without any actuarial reduction if he has attained a certain age (normally age 60 or 62) and completed a substantial amount of service (25 years, for example). Similar provisions exist in the railway plans. In a number of the private plans, members can elect to retire after the age of 55 on a reduced pension provided they have completed a certain period of service. In assessing the value of this benefit the actuarial factors used to arrive at the reduced considered, but it should be noted that in some plans the factors used imply a certain degree of subsidy of this benefit by the employer. Under the rules of the Canadian National plan an employee may retire at age 55 if his age plus service is at least 85. Corresponding provisions do not exist in the Canadian Pacific plan.

As mentioned in the analysis of the public sector plans, employees who retire early may have a gap in their pension income which is not filled until age 65 when Canada Pension Plan retirement pensions normally become payable. Over half the private plans examined in this analysis provide, to some extent, "bridge" benefits to their retired employees during this period. The amounts of the benefit provided vary considerably, and in some cases the payment of the benefit is contingent upon the employee's fulfilling certain age and service requirements which not all employees who retire early can meet. Until now, this type of benefit has not been provided by the railways. While one may argue that it is the total pension (employer plan and government benefit) that really counts, the fact remains that the "bridge" benefit is appreciated by employees, yet is not provided by the railway plans.

Type of Plan

The private plans surveyed show a diversity of benefit formulas. Seven of the plans calculate retirement income as a proportion of the employee's best (or last) few years of earnings. In 6 of these, a 5-year period was used just as in the case of the railway plans. Three of the plans used a career earning formula, although in one of these the career earnings benefit represented the minimum pension. In this case the pension benefit was initially calculated as 50% of the employee's contributions. In the 2 remaining plans the pension benefit was \$120 p.a. for each year of service. These 3 plans were also non-contributory and the pension benefits were stacked on top of the Canada Pension Plan benefits. The final average earnings plan is generally regarded as being the most valuable from the viewpoint of the employees, and in this respect the railway plans are at least as good as the best plans in the sample.

It is of course necessary to examine the amount of benefit accrued for each year of service in comparing final average earnings plans. Four of the plans provide a benefit of 2% per year of service and the others provide somewhat lesser amounts. The railway plans thus compare favourably with these top 4 plans.

The analysis to this point has focussed on the initial level of retirement income. It is significant to note that 11 of the 13 private plans have granted ad hoc increases in recent years. These increases have been determined in a number of different ways and aim to restore, to some extent, the loss of purchasing power caused by the severe inflation in recent years. In the case of final average plans, such increases are typically at the rate of 2 or 3% for each year since retirement. The tendency in flat benefit plans is to increase pensions by fixed amounts. The escalation provided by the Canadian National plan is in keeping with that provided by the top plans in the sample.

Since the Canadian Pacific plan has not increased current pensions in this way, it differs from the majority of the group. However, Canadian Pacific has on two occasions increased pensions by extending improvements in benefits to retired employees. The details are given in the chronological details of major pension changes for C.N.R. and C.P.R. Both railway plans have an unusually high ratio of pensioners to actives. This is because the plans are relatively mature and the labour force in the railway industry has been declining in recent years. Consequently it is relatively more expensive to grant increases to current pensioners in these plans than it is in the case of most of the other plans considered.

Death in Service Benefits

Nine of the 13 plans provide a survivor's pension on the completion of certain age and/or service requirements. In the case of 7 of those 9 plans the survivor's pension is equal to 50% of the accrued pension, and in the remaining 2 the survivor's pension is equal to 66-2/3% of the accrued pension. The 2 plans providing the 66-2/3% benefit do not have any service condition for eligibility. However, in both these plans there is a guarantee that the pension will not be less than a fixed percentage of final average earnings at the date of the employee's death. (This percentage is about 15%). The 7 plans which provide a 50% survivor's benefit have service requirements ranging from 10 years (5 plans) to 20 years. In some of these, the service requirement is coupled with an age requirement. Should an employee die before completing these requirements, the death benefit payable normally consists of a refund of his own contributions with interest. Similar provisions exist in the case of the railway plans.

In most of the plans which provide a survivor's death-in-service pension the pension is payable until the death of the surviving spouse. The survivor's benefit provided by the railway pension on death in service is 50% of the employee's accrued pension. This tends to produce a larger survivor's pension than the average for the group as a whole because the accrual rate of benefit is higher in the railway plans. The 15-year

gap before a railway employee qualifies for a survivor's benefit is greater than the corresponding gap in most of the other plans. The Canadian National survivor's benefit is payable until the death of the surviving spouse. On the basis of the plans examined this appears to be a more common practice than that in the Canadian Pacific Plan, where the survivor's pension stops on remarriage.

Group Life Insurance Benefits

Many of the companies surveyed provide a basic benefit of one year's salary, with the possibility of increased coverage. The cost of this additional coverage may be shared between the employer and the employees or the cost may be borne entirely by the employees. The corresponding benefit in the case of the railway employees is a lump sum of \$7,000 and is thus lower than the average for the group as a whole.

Death After Retirement

The benefits provided by the railway plans in the event of death after retirement compare favourably with the group as a whole. Only 3 of the 13 plans provide an automatic survivor's pension on death after retirement. The benefit level in these 3 plans is 50% of the retired employee's pension, which is the same as the benefit level provided under the railway plans. This tends to be a much more costly benefit than the survivor's death-in-service benefit. Consequently, this is one area where the railway plans demonstrate a significant superiority. The survivor's pension from Canadian Pacific ceases on remarriage while the corresponding Canadian National pension is payable for the life of the surviving spouse.

It should be pointed out that the private pension plans in the sample which do not have an automatic survivor's death-in-retirement benefit, permit a retiring employee to elect to take some form of joint and survivor pension. Often the rates used to convert the single life pension to the equivalent joint life pension are subsidized by the company and are not the true actuarial rates. To this extent, the entries in the matrix under this item could be construed as misleading in the case of these plans. However, the degree of subsidy varies considerably among the plans.

Disability Benefits

All but 3 of the 13 companies examined have long-term disability plans, providing disability benefits of the order of 60% of the disabled employee's earnings. Over half of the pension plans provide disability benefits if the disabled employee meets certain age/service qualifications. For those companies which provide disability benefits from both sources, it is usual for the benefits from the long-term disability plan to be reduced by the benefits from the pension plan. The railway pension plans provide a disability pension if the disabled employee has completed 15 years' service, and in the case of Canadian Pacific, if age plus service totals at least 60. There is thus a considerable gap in disability coverage by the railways as compared with a number of the other

companies examined. Furthermore, the level of benefits payable to the disabled employees are normally considerably higher in a number of the 13 plans than they are in the railway plans since the accrued pension reaches 60% of average earnings only when the employee has completed at least 30 years' service.

Termination Benefits

Most of the private plans examined are subject to either provincial or federal pension benefit legislation, which stipulates that a terminating employee who has completed at least 10 years' service and reached at least age 45 is entitled to a deferred pension. This deferred pension is calculated in the same way as the normal retirement pension, but is based on the employee's salary and service to date of termination. Similar vesting provisions exist in the railway plans.

The practice with regard to terminating employees who do not meet these requirements varies among the private pension plans examined. In the case of the non-contributory plans there may be no benefit (2 plans) or else a deferred pension may be granted if the terminating employee has more than 10 years' service. In the contributory plans a common formula is for the terminating employee to receive a refund of his own contributions with interest if he leaves with less than 10 years' service. After completing 10 years' service the terminating employee often has the choice of a refund of his own contributions with interest or a deferred pension, calculated according to the rules of the plan and payable from normal retirement date. Of course he is required to take a deferred pension when the government legislation applies (i.e. age 45 and at least 10 years' service).

The provisions of the railway pension plans with regard to terminating employees do not differ significantly from those of the group considered, apart from the railways' use of 15 years' service to establish when the employee has the choice of a deferred pension or refund of his own contributions. The corresponding cut-off point in the case of the private plans is 10 years. However, in strict dollar terms, the refund of contributions can be just as valuable as the deferred pension until the employee reaches his 40's, depending of course on his earnings record. Furthermore, since the contributions to the railway plans are and have been higher than the average for the group as a whole, the return of contributions tends to represent a more substantial benefit in the case of a terminating railway employee.

Perhaps the most important conclusion from the analysis of termination benefits is that while the provisions of the railway plans are in line with general practice, the system as a whole does not favour the terminating employee. Even if compulsory immediate vesting were introduced, it would not solve the problem. In a final average salary plan, the terminating employee would be entitled to a benefit based on his service and final average earnings at date of termination. Had he remained with the original company, this service would be multiplied by his final average earnings from age 60 to age 65. The difference between these can be enormous, and this is a measure of his

loss on leaving. An employee who makes a number of job changes, even under this system, would end up with a pension very similar to one based on career average earnings.

Trusteeship Arrangements

The trusteeship of the 2 major railway plans has been criticised in a number of submissions received by the Commission. It is therefore of some interest to compare the trusteeship arrangements of the 13 private plans with those of the 2 major railways.

The breakdown of the trusteeship arrangements of the 13 plans examined is as follows:

<u>Nature of arrangement</u>	<u>Number of companies with this type of arrangement</u>
Trust company acts as trustee	5 companies
Insured arrangement	4 companies
Individual trustees	3 companies
Trustees are officers of the company	1 company

Leaving aside the insured arrangements which are not strictly comparable with the railway plans, one can see that it is most usual for a trust company to act as a trustee. In the case of 3 plans, the trusteeship arrangement consists of individual trustees. In one of these plans there are 5 individual trustees, 3 appointed by the company and 2 by the members. For the 2 remaining plans the composition of the trustees has not been established. However, it is reasonable to surmise that at least one of the trustees is independent to some extent of the company involved in view of the following Department of National Revenue regulation relating to registered pension plans. This quotation is taken from the description of permitted types of funding media:

“(e) Funding Media: – the pension plan must be funded through:

(i) a contract for insurance with a company authorized to carry on a life insurance business in Canada,

(ii) a trust in Canada governed by a written trust agreement under which the trustees are:

(a) a trust company, or

(b) individuals, at least 3 of whom reside in Canada and 1 of whom must be independent to the extent that he is neither a significant shareholder, partner, proprietor nor an employee of a participating company. (See also paragraph 6 (9)]

(iii) a corporate pension society

(iv) an arrangement administered by the government of Canada or by the government of a province of Canada, or by agents thereof, or

(v) combinations of the above funding media..."

Source: Department of National Revenue, Taxation: Information Circular No. 72-13R3

Date: December 1, 1975.

In the case of each of the 2 major railway plans, the Board of Directors also acts as the trustee of the pension plan. Only in the case of company B did this complete overlap between the trustees of the pension plan and the management of the company occur. Thus the trusteeship arrangements found in the major railway plans are significantly at variance with common practice.

Furthermore, this type of arrangement contravenes, in my opinion, at least the spirit of the Department of National Revenue regulations on registered pensions. It also would appear to be contrary to the aims of the various pension benefits standards acts. Since the Board of Directors of the major railway companies act as trustees of their respective pension plans, this can lead to accusations of conflict of interest. The trusteeship arrangements of the railway plans studied under the Terms of Reference are given in the following table.

Railway Company	Number of employees (approx.)	Trusteeship arrangements of pension plan
Canadian National Railways (CN)	83,800	Board of Directors of CN
Canadian Pacific Limited (CP)	40,500	Board of Directors of CP
Toronto Hamilton and Buffalo Railway Company (TH & B)	190	Royal Trust Co.
Toronto Terminals Railway Company (TT)	230	Board of Directors of TT

Railway Company	Number of employees (approx.)	Trusteeship arrangements of pension plan
Northern Alberta Railways Co. (NAR)	550	Board of Directors of NAR
Algoma Central Railway	1,800	Insured arrangement

Summary

In many important respects the railway pension plans provide benefits which compare favourably with the best plans in the group. The railway plans use final average earnings in computing the retirement pension and, in conjunction with Canada Pension Plan benefits, produce a retirement pension of 70% of final earnings in the case of a career employee. Most of the other benefits are derived with reference to the formula used for the retirement benefit. Thus the railway plans have a survivor's pension of 50% of the accrued pension in the case of death in service and 50% of the retired employee's pension in the case of death after retirement. The comparison indicates that the group life benefits are relatively low and that there are deficiencies in the disability coverage. The eligibility conditions for a number of the benefits appear to be more restrictive in the railway plans, particularly in the case of Canadian Pacific.

The situation with regard to cost-of-living increases has already been discussed. Since these increases often apply to retirement pensions, survivors' pensions, and disability pensions, their impact is felt across the range of benefits. It has been noted that the provision of such increases in the case of the railway plans is relatively more expensive because of their demographic history. The trusteeship arrangements prevailing in the 2 major railway plans are at variance with common practice.

Conclusions and Recommendations

I indicated earlier in my report that railway pension plans are the subject of collective bargaining between the C.N.R., the C.P.R., and the C.R.L.A. In my opinion, representations made to me that pension plans should be removed from that area are not well-founded. The only other means for making such decisions would be by unilateral determination by the railway companies, and that would be a retrograde step, or by governmental decree, and that would be contrary to our general expectations concerning government involvement in the private sector.

Just as the bringing of pension plans within the scope of collective bargaining has been a positive step in the evolution of labour relations in the railway industry, so too has been the emergence of the C.R.L.A. as the principle agency for expressing the

interests of railway employees, past and present. Through the formation of C.R.L.A., industry-wide bargaining is now a reality, and a great deal of stability has been introduced in the railway industry.

In these circumstances, the parties to collective bargaining, particularly the employers, are entitled to a clear indication from me as to where it is appropriate, in my opinion to make recommendations. My general view is that I should refrain from making recommendations when the evidence clearly suggests that the C.R.L.A. and the C.N.R. and the C.P.R. are capable of dealing with the issue or problem through established collective bargaining procedures. For example, the C.R.L.A. is perfectly capable of establishing a position on such issues as the level of employee and employer contributions, retirement age and service conditions, retirement benefits, survivor's benefits, the relationship between the railway plans and government plans (C.P.P./Q.P.P.), and similar provisions in the plans. If changes are to be made, they will have to be formulated by C.R.L.A., evaluated by C.R.L.A. in conjunction with other changes they may anticipate in the collective agreement, and worked out with the C.N.R. and the C.P.R. at the bargaining table. Given the progress that the parties have made to date, it would be quite irresponsible for me, as a Commission of Inquiry, to begin making recommendations that would undo or weaken that relationship.

Stated positively, I am of the opinion that I should make recommendations *only* in those areas that *clearly* are outside the collective bargaining arena, or where glaring inequities appear to exist, or where the interests of retired employees appear not to have been well-served through collective bargaining, or where aspects of railway pension plans appear to be at variance with desirable Public Policy.

Recommendation 1: That retired employees of the C.P.R. should be granted the same level of increase in pensions since retirement as those granted by the C.N.R. to its retired employees. These increases have been approximately 2% annually each year since 1970 and should apply to all those retired prior to January 1st, 1973. These increases should also apply to those in receipt of survivor pensions.

As noted earlier, improvements were made to the C.P.R. plan in 1971 and 1973. The purpose of this recommendation is to bring C.P.R. pensioners and their survivors up to (but not above) the increases granted to C.N.R. pensioners and their survivors.

Recommendation 2: That the provisions in the C.P.R. pension plan terminating survivor benefits upon the remarriage of the eligible widow or widower be removed.

Recommendation 3: That the provisions in the C.P.R. pension plan requiring marriage 5 years prior to the death of the employee or pensioner in order to qualify for a survivor's pension be reduced to one year.

Recommendation 4: That the provision in the C.P.R. pension plan limiting eligibility to employees hired before age 40 be changed to read "hired before age 60".

PENSION PLANS COMPARISON

*Y-MPE denotes the Year + Maximum Pensionable Earnings for the purposes of the Canada Pension Plan.

Recommendation 5: That the trusteeship of both the C.N.R. and the C.P.R. pension plans be removed from the hands of the Boards of Directors of the respective companies and placed in the hands of an independent trust company.

Under both the C.P.R. and the C.N.R. pension plans, the Boards of Directors of the two companies also act as the trustees of the respective plans. This arrangement has been the subject of much criticism over the years and has led to accusations of conflict of interest in managing both the affairs of the respective companies and their pension funds. I am of the firm opinion that the current trusteeship arrangements contravene the spirit (if not the letter) of the Department of National Revenue regulations concerning registered pension plans. I am also satisfied that the current trusteeship arrangements are contrary to the aims of the Pension Benefits Standards Act. In the circumstances, the issue is not whether the funds have or have not been managed effectively under current trusteeship arrangements. The issue is, do the existing trusteeship arrangements conform with desirable public policy? In my judgement they do not and they should be brought in line with the expectations of the Department of National Revenue regulations and the Pension Benefit Standards Act.

In making my recommendation on trusteeship, I am mindful of the fact that the C.R.L.A. has requested that trusteeship be placed in a group of individuals representing the companies, the employees, and pensioners. At first blush, this would appear to meet everyone's needs admirably particularly pensioners, but after giving the matter considerable thought, I am of the opinion that such would not likely be the case. For example, I am at a loss to understand what form of "corporate" identity such a "group" would have. I am also uncertain how accountability for such individuals would be established and maintained. I also foresee some difficult problems in making such a group truly representative and in selecting individuals to serve, particularly in view of the fact that both plans cover employees that are not unionized and others who are either not directly employed by the main railways or who are employed through subsidiary companies, in some cases jointly owned by C.N.R. and C.P.R.

I think it is preferable that the trusteeship be placed in the hands of an independent trustee. I also recommend that instead of using the concept of a "corporate trustee" embodied in the PBS Act, it would be much better to amend that Act to use language similar to that contained in the Income Tax Act, namely, that a trustee by defined as a corporation licensed or otherwise authorized under the laws of Canada or a province to carry on in Canada the business of offering to the public its services as trustee". I so recommend.

There is the possibility that one or both of the major railway companies might acquire effective control over the trustee, but it should be possible to develop adequate safeguards against that eventuality.

Part IV

EVALUATION OF THE PRESENT PLANS AND POSSIBLE AMENDMENTS

I propose to treat a number of items in my terms of reference *together* in this part of my Inquiry. These include:

The soundness and suitability of the present actuarial methods and bases of funding the plans and of possible alternative methods and bases of funding, notwithstanding existing statutory requirements;

The future development of the Canada and Quebec Pension plan benefits and liabilities;

Contributions to the Pension Funds made by employees and employers;

The trusteeship and administration of Railway Pension Plans and Funds;

Any matter incidental to or relating to any of the foregoing matters including, without restricting the generality of the foregoing, an actuarial evaluation of the long- and short-term implications of the costs and other obligations inherent in its findings as these may affect the employees and the employers involved.

In addition, my Inquiry must now begin to examine the cost-of-living indexing of pension benefits. In my judgement, this latter item is the central issue facing my Commission. It underlies almost every submission made to me during a long and difficult Inquiry.

Under my terms of reference, I was empowered to engage the services of such actuaries and other persons necessary to assist me in my Inquiry. For this purpose, I engaged the services of Paterson, Cook Limited, compensation and benefit consultants and consulting actuaries in the City of Vancouver. As actuaries to the Commission, they worked closely with the Pension and Welfare Plans Department of the Canadian National Railways and with the Montreal Office of William M. Mercer Limited, actuaries for the C.N.R. Similarly, their studies were based on membership and assets data provided by Canadian Pacific Limited and their consulting actuaries, Towers, Perrin, Forster and Crosby. In all of this exceedingly large and time consuming task, my actuaries received the utmost assistance of the C.N.R., the C.P.R. and their respective consulting actuaries.

As a further complication to their already heavy burden, I asked my actuaries to examine the following questions concerning the C.N.R. and the C.P.R. pension plans, as possible amendments to those plans:

1. What would it cost the C.N.R. and the C.P.R. pension plans to implement a cost-of-living adjustment for current pensions?
2. What would it cost to apply the 2% formula to currently-retired C.N.R. and C.P.R. employees?
3. What would it cost to increase the level of benefits for widows and survivors of pensioners to 60%, 75% and 95% of the entitlement of the pensioner under the C.N.R. and the C.P.R. pension plans?
4. What improvements in the level of benefits for current pensioners can be supported by a levy of 1% of existing payrolls, shared equally by current employees and the Company under the C.N.R. and the C.P.R. pension plans?

These questions are not mutually exclusive, but were designed to assist me in coming to grips with the vexing and controversial problems associated with the declining value of pension benefits in the face of high levels of inflation.

In order to limit the length of my report, I am including herein only those aspects of the more detailed analysis as are necessary to assess my findings and recommendations. Those requiring the more detailed actuarial and technical reports may have access to them at a later date.

Of necessity, the C.N.R. and the C.P.R. plans must be examined separately although the nature of the analysis is the same in each case. This leads to some duplication in the narrative and explanation, but it cannot be avoided.

C.N.R. Pension Plans

Analysis of Assets

This section analyzes the present structure of the Pension Trust Fund assets, the recent rates of return on the invested assets, and the relative performance of the C.N.R. Fund compared with other pension funds.

To illustrate the relative magnitude of the contributions, income and disbursements of the Fund, Table I shows the development of the Fund in the year 1974.

TABLE I
DEVELOPMENT OF PENSION TRUST FUND

		\$ Millions
Book Value of Fund at December 31, 1973		1,049.9
Contributions:		
By Employees	53.9	
By C.N.R.	<u>95.9</u>	
Investment Income:		149.8
		61.1
Disbursements:		
Refunds to Employees	6.0	
Pensions Paid	<u>84.7</u>	
Book Value of Fund at December 31, 1974		(90.7)
		<u>1,170.1</u>

Note: The values shown above are on an accrual basis; that is, they include amounts receivable and benefits payable.

Table II shows the breakdown of C.N.R. pension fund investments as at December 31st, 1974 in terms of book values and market values. Over the past four years from December 31st, 1970 to December 31st, 1974, there has been a significant increase from a total of 28% to 39% of the book value of the fund committed to common stocks and a corresponding reduction in the relative size of bond holdings.

TABLE II
*BREAKDOWN OF PENSION FUND
 INVESTMENTS BY TYPE
 AT DECEMBER 31, 1974*

	Book Value \$ Millions	% of Total Book Value	Market Value \$ Millions	% of Total Market Value
Bonds	\$ 358.8	31%	\$ 281.2	29%
Stocks	445.9	39%	344.9	35%

	Book Value \$ Millions	% of Total Book Value	Market Value \$ Millions	% of Total Market Value
Mortgages, Real Estate and Short- Term Invest- ments (at Book Value)	345.5	30%	345.5	36%
Total	<u>\$1,150.2</u>	<u>100%</u>	<u>\$ 971.6</u>	<u>100%</u>

The rates of investment return achieved by the C.N.R. Pension Trust Fund in recent years are shown below. The yields have been determined on a market value basis and recognize realized and unrealized capital gains and losses as well as investment income.

Year	Annual Rate of Return
1970	5.05%
1971	10.92%
1972	11.83%
1973	-1.36%
1974	-6.64%

The effective yield achieved on the invested assets over the five years from January 1, 1970 to December 31, 1974 is equivalent to a constant rate of return of 3.45% per annum.

At the time of my Inquiry, my actuaries had not received comparative investment performance studies (Wood Gundy or A.G. Becker reports) on the C.N.R. Fund but such comparisons as they have made indicate that the C.N.R. Fund has achieved second- and third-quartile results over the last four or five years, varying depending on the survey used and the time period chosen. On the basis of these brief comparisons, it appears that the recent performance of the C.N.R. Fund has been approximately average among pensions funds in Canada.

Valuation of Assets

There are several asset valuation methods in current use for pension plan actuarial valuations. These include, separately and in combination, market value, book value (cost of amortized cost), capitalized values based on discounting future anticipated receipts from the investments, and a variety of "write-up" methods for linking asset values at the end of a plan year to the value at the end of the preceding year in accordance with the formula. For the last valuation of the C.N.R. pension plans (December 31st, 1972) the assets of the Pension Trust Fund were valued at book.

Each asset valuation method can produce reasonable results if used together with appropriately corresponding economic assumptions for the valuation of the plan's liabilities. For example, if current interest rates are abnormally high, the current assets of the plan would be fully valued (full cost or amortized cost) at book but current market value would be below book value. In this case, it would be appropriate to assume higher future investment returns based on market values than on book, at least for as long as the abnormally high interest rates are expected to prevail. Conversely, if market value exceeds book value, it would be logical and appropriate in valuing the liabilities to use a lower assumption as to future investment returns if the pension plan assets are valued at market than if the assets are valued at book.

Both interest rates and market values of securities are subject to erratic variations due to random market fluctuations. It is therefore impossible to be absolutely precise in selecting an appropriate combination of asset values and economic assumptions. The best one can do is to pick *fair and reasonable* values based on the most relevant data available.

For the purpose of the C.N.R. valuation and subsequent cost estimates for my Inquiry, my actuaries proposed to value the assets using the approximate market value of the assets of the C.N. Pension Trust Fund as at December 31st, 1974) adjusted to reduce the effect of chance market fluctuations. Consistent with this, in valuing the liabilities they proposed to use economic assumptions which project current economic circumstances for the short term, and more normal circumstances in the longer term. The economic assumptions are detailed later in this section of the report. I accept these proposals as being fair and reasonable.

Assets as Reported

Table III, below, shows the book and market values of assets as at December 31, 1974 as reported to the commission by C.N.R. Both totals include mortgages, real estate and lease-backs actually valued at book.

TABLE III

*ASSETS AT DECEMBER 31, 1974
AS REPORTED BY C.N.R.*

	<u>Book Value</u>	<u>Market Value</u>
Bonds	\$358,839,000	\$281,191,000
Stocks	445,865,000	344,903,000

	<u>Book Value</u>	<u>Market Value</u>
Mortgages (including real estate and lease-backs)	315,919,000	315,919,000*
Cash, receivables and short-term invest- ments	49,448,000	49,448,000
TOTAL	<u>\$1,170,071,000</u>	<u>\$991,461,000</u>

*Book Value in the case of mortgages.

Mortgage Adjustment

To adjust the mortgages, real estate and lease-backs to approximate their true market value at December 31, 1974, my actuaries multiplied the book value by 85% resulting in an approximate market value of \$268,531,000 for these classes of securities. The 85% factor was based on information on the relative amounts of each of these types of securities and on their average annual rate of return on book value supplied by C.N.R. and on the fact that prevailing new mortgage yields at December 31, 1974 were in excess of 11½%. The 85% factor is roughly correct for a mortgage with 10 years payments remaining. It understates the true market value for mortgages with fewer payments remaining, and vice-versa.

Trend Line Adjustments

It was then necessary to adjust the market values at December 31, 1974 to reduce the effect of chance market fluctuations in the stock market and in prevailing bond and mortgage values. This was accomplished by increasing the market values of bonds, stocks and mortgages by 3%, 15% and 5%, respectively. These factors were determined by examination of the long-term trend of the Toronto Stock Exchange (TSE) Industrial Index and of several indices of bond and mortgage interest rates. This examination indicated that the TSE index was below the trend line and interest rates were above their trend lines on December 31, 1974. The 3%, 15% and 5% adjustments increase in the market values of the respective classes of securities to an approximation of the underlying market values at December 31, 1974, without chance market fluctuations.

The results of the adjustments are as follows:

TABLE IV

*MARKET VALUE OF ASSETS AT DECEMBER 31, 1974
WITH ADJUSTMENTS*

	<u>Actual Market Value</u>	<u>Market Value Adjusted for Trend Line</u>
Bonds	\$281,191,000	\$ 289,626,000
Stocks	344,903,000	396,638,000
Mortgages	268,531,000*	281,958,000
Cash, receivables and short-term invest- ments	<u>49,448,000</u>	<u>49,448,000</u>
	<u><u>\$944,073,000</u></u>	<u><u>\$1,017,670,000</u></u>

*Approximate.

On the basis of this analysis, I propose to place a value of *\$1,020,000,000* on the assets of the C.N.R. pension trust fund as at December 31, 1974. In my opinion, this is a fair and reasonable valuation of the assets and it is consistent with the economic assumptions to be used in valuing the liabilities under the C.N.R. pension plan as of the same date. This valuation is 8% above market values and 13% below book values as at December 31, 1974.

NOTE: The apparent disparity in asset figures in Tables I, II, III and IV is *not* an error. It arises from the difference between "assets invested" and "assets available" for investment, particularly as it pertains to Cash.

Valuation of Liabilities

In valuing the liabilities of the C.N.R. pension plans and in preparing cost estimates related to possible amendments to the plans, my actuaries emphasized the long-term cost implications by using a level contribution actuarial method for all cost estimates. They examined alternative short-term funding strategies for only one or two of the cost estimates, for comparative purposes. They also took into account the whole cost of the benefits and ignored consideration of government subsidies towards the cost of part of the benefits.

For estimates of the level of benefit to be supported by a given increase in the level of contributions, they prepared two estimates, one based on a static work force and the other on a declining work force. For all other estimates, they used "closed group" valuation based on the benefits and costs for the present group of members, pensioners and beneficiaries to determine the estimates of normal cost and unfunded liabilities.

To remove a degree of arbitrariness from the selection of the appropriate length of the amortization period for the unfunded liabilities, they reviewed the financial impact of the amortization schedule on the basis of both the static and declining work force projections before forming an opinion on the most appropriate amortization schedule.

It is my opinion that these procedures are both appropriate and practical, considering the very long-term nature of the plans, the likelihood of a declining work force in the railroad industry and the number of cost estimates prepared.

Specifically, they used the Entry Age Normal valuation method to determine the normal costs and unfunded liabilities. The amortization schedules for the respective unfunded liabilities were determined after the unfunded liabilities have been calculated, as described above.

As a test of the reasonableness of this approach, they examined the recommendations relating to actuarial methods and funding of both the Commission on Railroad Retirement and its Actuarial Advisory Panel in their Report to the President and the Congress of the United States of America dated June 30, 1972. This Report discusses, in some detail, concepts of actuarial soundness and their application to pension plans covering declining work forces in general and the U.S. railroad system in particular.

The approach taken by my actuaries is consistent in principle with the report of the commission on Railroad Retirement and its Actuarial Advisory Panel, with differences in detail to reflect the differences between the railroad pension systems of the two countries. In particular, Recommendation 10-2(c) reads as follows:

"(c) In the longer-run, as soon as some degree of normality in the system's finances is restored, a financing plan providing for a more substantial degree of actuarial soundness should be adopted. Such a plan should provide for reserves to cover the liabilities of the system to present members of the system more fully, ideally by a plan for amortization of the accrued unfunded liabilities of the system; e.g., over 30 years."

Actuarial Assumptions

The following comments on actuarial assumptions are divided into two sub-topics, economic assumptions and demographic assumptions. Throughout, it was assumed that no administrative expenses would be charged to the Pension Trust Fund but would be borne directly by the Company.

Economic Assumptions

In determining appropriate economic assumptions, my actuaries have been guided to some extent by Dr. Deutsch in his Commission of Inquiry Report of December 27th, 1973 relating to certain railway pension costs, and to some extent by Boyle, Brooks-Hill and Paterson's empirical study of past (1924-1973) Canadian wage increases, price increases and rates of returns on bonds and stocks.

The economic assumptions used are displayed in Table V, below, with comparative figures taken from the Deutsch Commission Report.

TABLE V

ECONOMIC ASSUMPTIONS

	Proposed Economic Assumptions			Deutsch
	1974 to 1979	1980 to 1984	1985 and Later	1973 Assumptions All Years
Annual Rate of:				
Increase in Consumer Price Index	8%	5½%	3%	3½%
Increase in Average Wage and Salaries	10%	7½%	5%	6½%
Return on Pension Fund Assets	10%	8½%	6½%	8%

Comparisons with Previous Assumptions

The major difference between these economic assumptions and the Deutsch Commission assumptions is the reduction in the long-term normal differential between average wage and salary increases and price increases for 3% to 2%. I am satisfied that the 2% differential is justified on the basis of both past experience and future prospects. These assumptions attempt to reflect current economic patterns for the next few years, gradually modifying into the long-term pattern by 1985.

For additional comparison, the economic assumptions employed in the valuation report on the C.N.R. pension plans as at December 31, 1972 were as follows for 1975 and all later years:

<i>Annual Rates of</i>	<i>1975 and later</i>
Price Increase	Not applicable
Wage and Salary Increase	4% (plus an "additional margin" for 1975 and 1976)
Return on Assets	7½%

YMPE Projection

Consistent with the current statute, my actuaries assumed that the Year's Maximum Pensionable Earnings (YMPE) under the Canada Pension Plan will increase at the rate of 12½% per annum from its current base (1975 - \$7,400) until it catches up with an index based on the Statistics Canada Industrial Composite of average weekly wages and salaries, annualized (June 1975 - \$10,563). Based on the economic assumptions set-out above, the catch-up will take place in 1986. Beyond that year, my actuaries assumed annual increases in the YMPE of 5% per annum, consistent with the economic assumptions noted above. This approach is similar to that followed in the Deutsch Commission Report. In the December 31, 1972 valuation of the C.N.R. plans, it was assumed that the YMPE would increase by 12½% per annum until 1980 and thereafter by 4% per annum.

Demographic Assumptions

In examining the past actuarial methods and the basis for funding of both the C.N.R. and the C.P.R. pension plans, and in responding to the four questions posed by me as possible amendments to these plans, my actuaries conducted a thorough analysis of the demographic assumptions used in the most recent valuation of the plans. This analysis included such important categories as salary increase rates, post-retirement and widows mortality rates, disability rates, pre-retirement mortality rates, and employee turnover rates.

In some areas of analysis they endorse the assumptions used in the most recent evaluations of the plans; in other areas they propose the adoption of differing demographic assumptions, particularly in determining the liabilities and cost estimates involved in assessing the impact of possible amendments to the plans. This work is extremely important but it is highly technical in nature and I therefore do not intend to include it in the body of my report. The results of these studies are available however to anyone who wishes them for examination.

*Valuation Results of Cost Estimates for Possible
Amendments to the C.N.R. Plans*

As indicated earlier, I asked my actuaries to examine the cost implications of four questions, as possible amendments to the pension plans. The detailed interpretation of these questions is set-out below for the C.N.R. plans.

1. *"What would it cost the Canadian National Railways pension plans to implement a cost-of-living adjustment for current pensioners?"*

My actuaries examined the cost of providing an increase effective January 1, 1975, in *all* pensions then in payment to pensioners, survivors and estates. In each case, the increase would be the full percentage increase experienced by the Consumer Price Index (Canada, all items - published by Statistics Canada) from January 1 of the year in which the pension commenced to January 1, 1975, adjusted to remove duplication of increases already granted. In the case of a pension in payment to the spouse of a deceased pensioner, the increase would be from the date of retirement of the pensioner. These increases would apply to the entire pension payable under the 1959 plan, to the Basic and Service pensions under the 1935 plan, but not to the money-purchase portion of pensions under the 1935 plan.

In addition to providing cost information on the single retroactive adjustment up to January 1, 1975, they prepared cost estimates for providing *future* cost-of-living increases in pensions for pensioners, deferred pensioners, survivors and current active employees.

These cost estimates were prepared both with and without the changes considered in question 2 below.

2. *"What would it cost to apply the 2% formula to currently-retired C.N. Employees?"* For 1959 plan pensioners, the revised pensions were calculated on the basis of the final average/best average earnings base now used for active employees and a formula of 2% of such earnings for each year of service up to a maximum of 35 years, less 0.7% of earnings up to the "Average Maximum Pensionable Earnings" for each year of active service after January 1, 1966. Each recalculated pension has been subjected to the same reduction for contribution deficiencies as applies to active members.

The 50% pensions were also re-calculated for surviving spouses and estates, following the same rules.

Liabilities for terminated employees currently entitled to deferred pensions and current pensioners whose pensions had earlier been deferred were also re-calculated.

For 1935 plan pensioners who were alive on January 1, 1975, all pensions were completely re-calculated on the same 2% formula, including survivors' benefits, as described above for the 1959 plan pensioners, subject to the same contribution deficiency rules, and with additional pension being payable in respect of any voluntary contributions which a pensioner made in any year before 1952 in excess of 5% of earnings, and in any year after 1951 in excess of the contribution rate which applied under the 1959 plan for that year. The re-calculation was applied to former deferred pensioners who are now on pension and to spouses of 1935 plan pensioners who are now receiving pensions because of the election of a "joint and last survivor" pension option.

They also examined the effect on costs if all *1935 plan members* who were active members at January 1, 1975 were transferred to the 1959 plan for all years of service, subject to the normal contribution deficiency rules.

3. *"What would it cost to increase the level of benefits for widows and survivors of pensioners to 60%, 75%, and 95% of the entitlement of the pensioner?"* My actuaries examined the cost of providing an increase in the size of the survivor benefits for the present level of 50% of the regular pension to 60%, 75%, and 95% of the regular pension, to each of the following:

- a) deceased pensioners' spouses and estates currently in receipt of 50% pensions,
- b) widows, widowers and estates of current pensioners at January 1, 1975,
- c) future widows, widowers and estates of present active members and terminated employees currently entitled to deferred pensions.

They examined the cost of providing this increase benefit alone, and also in combination with the improvements set forth in question 1, and in question 1 and 2 combined.

There has been no change to the death benefits payable under the pension plans in respect of death prior to actual retirement.

4. *"What improvements in the level of benefits for current pensioners can be supported by a levy of 1% of existing payrolls, shared equally by current employees and the Company?"* This type of improvement might apply instead of, but not in addition to, the improvements discussed in questions 1, 2, and 3 above.

There are various approaches that could be adopted in providing benefit improvements supported by such a levy. The most obvious would be to provide a retroactive cost-of-living improvement, as discussed in question 1 above, for all present pensioners, deferred pensioners, spouses and estates. The levy of 1% of

existing payrolls would be a permanent one and would apply to the existing payrolls as they increase or decrease over the years. In other words, it would be a permanent levy of $\frac{1}{2}\%$ of earnings to active members and of $\frac{1}{2}\%$ of total payroll to the Company.

Two estimates of the possible benefit improvement were prepared, one based on a static workforce, the other on a declining workforce.

In addition to these possible amendments, my actuaries examined the concept of "delayed" cost-of-living indexing. Under this concept, which is in my experience a unique innovation in pension plan design, the pensioner (or his spouse or dependents, in the case of a survivor's pension) would absorb the first 25 - 30% of lost purchasing power arising from inflation. After that defined or prescribed level of losses, with a guarantee to the pension recipient that the real value of the pension would not be eroded beyond the prescribed level.

The main body of results of the actuarial valuation and cost estimates, as at January 1st, 1975 under the C.N.R. pension plans are set-out in the following pages, these results are based on the actuarial methods and assumptions described above and on the valuation of assets described earlier.

The current service costs and accrued liabilities have been determined using the "entry age normal" valuation method. Under this method, the total (Company and employee) current service costs per active member are determined as a level percentage of covered salary from date of entry to date of retirement required to finance all benefits expected to be paid in respect of the active members. Because under many of the estimates, employee contributions may represent a decreasing percentage of covered payroll (as employees reach a 35-year limit or \$2,500 limit), an adjustment was made by deducting the present value of future employee contributions from the present value of all future "entry age normal" current service costs and dividing the result by the present value of future salaries of the members to obtain a Company cost expressed as a level percentage of covered payroll. It should be noted that this is not the method employed by the C.N.R.

Those familiar with the design and modification of pension plans will appreciate the tremendous amount of detailed work required in doing this actuarial valuation and in providing the cost estimates for possible amendments to the plan. I am indebted to Paterson, Cook Limited for their painstaking, careful and often creative work in this regard.

The analysis led to a number of computer "runs" for alternative benefit formulas for the following groups:

- a) Pensioners, deferred pensioners and survivors,

- b) Active 1959 Plan members,
- c) Active 1935 Plan members.

Alternative benefit formulas are categorized under four headings:

- a) Benefit formulas not involving cost-of-living adjustments,
- b) Benefit formulas with past cost-of-living adjustments,
- c) Benefit formulas with both past and future cost-of-living adjustments,
- d) Benefit formulas introducing the concept of "delayed indexing".

Table VII contains a brief description of the employee data on which the actuarial valuation and cost estimates were based.

Table VI outlines the alternative benefit formulas considered and the respective "run" numbers for each combination of benefit formulas. Although my actuaries and I have attempted to define our terms as carefully as possible, the reader should make certain that the terminology is understood before interpreting the results.

Appendix 2 contains considerably more detail on the employee data used and some observations by my actuaries on the quality of the data and methods used to test its reliability.

Benefit Formulas without Cola Adjustments

Table VIII presents the valuation results and cost estimates as at January 1st, 1975 for Runs #1, 2, 3, and 4 without consideration of any possible cost-of-living adjustments, other than those already in effect for pensioners and survivors as at that date. For example, Run #1 includes the ad hoc increases granted to C.N. Pensioners and survivors prior to January 1st, 1975, but not those granted subsequently.

Run #1 is a summary of the results of an actuarial valuation of the C.N.R. pension plans as at January 1, 1975. The principal results of that valuation are an unfunded liability of \$1,102 million, a funded ratio of 48% and a current service contribution rate of 6.20% of covered payroll. If the unfunded liability were to be amortized by equal annual payments over a period of 30 years, the resulting annual amortization payment would be \$98.1 million per annum, *in addition to* the current service contributions in each year. Thus, for 1975, the total payment by the Company would amount to \$154.0 million which would represent a total of 17.09% of covered payroll.

TABLE VI

SUMMARY OF ALTERNATIVE BENEFIT FORMULAS

Membership Group	Description of Benefit Formula										
	Without COLA Adjustments			With Past COLA Adjustments			With Future COLA Adjustments			With "Delayed Indexing"	
	Run #1	Run #2	Run #3	Run #4	Run #5	Run #6	Run #7	Run #8	Run #9	Run #10	Run #11
Pensioners, deferred pensioners and survivors	current	original	2%	2%	original	2%	2%	original	2%	2%	2%
Active 1959 Plan members	current	current	2%	current	current	2%	current	current	current	2%	2%
Active 1935 Plan members	current	current	2%	current	current	2%	current	current	current	2%	2%
NOTES											

a) "COLA" refers to cost-of-living adjustments based on the full rate of past and/or anticipated future changes in the Consumer Price Index. The "Past" COLA adjustments apply only to pensioners and survivors. The "Future" COLA adjustments apply to pensioners, deferred pensioners, survivors and to active members.

b) The "current" formula refers to the present level of benefits being received by pensioners and survivors and the present formulas for active 1959 and 1935 Plan members.

c) The "original" formula for current pensioners and survivors refers to the benefit formula, net of contribution deficiencies, which was in effect at the date of retirement or of the spouse's death, respectively.

d) The "2%" formula refers to the benefit formula currently in effect for active 1959 plan members. It is assumed that all contribution deficiencies would be paid in full.

e) "Delayed Indexing" is a variation on COLA in which adjustments are made for the full rate of past and/or future increase in the Consumer Price Index, *in excess of the first 25% drop* in purchasing power of the pension.

TABLE VII

VALUATION FILE - DECEMBER 31, 1974
AGE, SERVICE AND EARNINGS SUMMARY

Number of Employees	Annual Rate of Earnings	Average Age*	Average Years of Service*	Average Annual Rate of Earnings	Proportion of Females
Active Employees					
1959 Plan - Canadian Rail	\$826,464,711	39.8	14.9	\$10,827	6.1%
1959 Plan - U.S. Employees	9,109,999	46.3	21.8	18,554	1.8%
1935 Plan - All Members	71,032,144	51.6	25.1	9,432	2.3%
Total	\$906,606,854				
Terminated Employees With Deferred Pensions					
1959 Plan	N/A	55.1	22.8	N/A	4.5%
1935 Plan	N/A	56.1	16.0	N/A	7.1%
Total	809				
Number of Pensions	Total Monthly Pensions	Average Age	Average Years Since Retirement	Average Monthly Pension	Proportion of Widows
Pensioners and Their Survivors					
1959 and 1935 Plans Combined	36,385**	\$7,047,131	72	11	\$194
					32%

* The average age and average service figures differ to some degree from those in preliminary studies due to different rounding procedures.

** 4,817 from the 1935 plan and 31,568 from the 1959 plan.

TABLE VIII

*ANALYSIS OF RESULTS AS AT JANUARY 1, 1975
WITHOUT COLA ADJUSTMENTS*
(in millions of dollars)

	<u>Run #1</u>	<u>Run #2</u>	<u>Run #3</u>	<u>Run #4</u>
<u>Description of Formulas</u>				
Pensioners, deferred pensioners and survivors	current	original	2%	2%
Active 1959 Plan members	current	current	current	current
Active 1935 Plan members	current	current	current	2%
<u>Balance Sheet</u>				
Assets	\$1,020	\$1,020	\$1,020	\$1,020
Accrued liabilities	2,122	2,045	2,211	2,375
Unfunded liabilities	1,102	1,025	1,191	1,355
Funded ratio	48%	50%	46%	43%
Annual amortization payment - 30 years	\$ 98.1	\$91.3	\$106.1	\$120.7
<u>Current Service Contributions for 1975</u>				
Employee	\$ 43.5	\$ 43.5	\$ 43.5	\$ 46.7
Company				
- \$	55.9	55.9	55.9	59.5
- % of covered payroll	6.20%	6.20%	6.20%	6.60%
<u>Total Company Contributions for 1975</u>				
- \$	\$154.0	\$147.2	\$162.0	\$180.2
- % of covered payroll	17.09%	16.33%	17.98%	20.00%

NOTES

a) See notes at bottom of Table VI for descriptions of COLA and of the "current", "original" and "2%" formulas.

b) The amortization calculation is based on the interest rates described in Table V

It should be noted that the current service contribution rate as a percentage of payroll would remain relatively constant from year to year in the future, but the annual amortization payment would represent a decreasing percentage (e.g., 10.89% in 1975, 4.33% in 1994 using the declining workforce projections set-out in Table XV of covered payroll from year to year and would completely vanish at the end of 30 years on the basis of the actuarial assumptions adopted. A more detailed analysis of the results of Run #1 is contained in Appendix 3.

Run #2 represents the valuation results if no change were made to the benefit formulas for active members of either the 1959 or 1935 plans, but the pensions in payment to pensioners and survivors were reduced to the amounts which were originally granted to each of them on their respective dates of retirement. The purpose of this Run is to indicate the value of the pension adjustments which *have been granted up to and including January 1, 1975*. The principal results of Run #2 are an unfunded liability of \$1,025 million, a funded ratio of 50% annual amortization payments over 30 years of \$91.3 million per annum and current service contributions by the Company of 6.20% of covered payroll.

Run #3 represents an estimate of the valuation results if the benefits for pensioners, deferred pensioners and survivors were re-calculated on the 2% formula which is currently in effect for 1959 Plan members, subject to the payment by the recipients of all "contribution deficiencies" as required by the 1959 Pension Plan, while *the benefit formulas for the active members of the 1959 and 1935 plans remain unchanged*. The principal results of Run #3 are an unfunded liability of \$1,191 million, a funded ratio of 46%, annual amortization payments over 30 years of \$106.1 million per annum and current service contributions by the Company of 6.20% of covered payroll.

Run #4 represents the estimated valuation results if the benefits for both the pensioner, deferred pensioner and survivor groups and the active 1935 Plan members were re-calculated using the 2% formula currently in effect for 1959 plan members, subject to the same reduction for "contribution deficiencies" as applies to active 1959 Plan members. The principal results of Run #4 are an unfunded liability of \$1,355 million, a funded ratio of 43%, annual amortization payments over 30 years of \$120.7 million per annum and current service contributions by the Company of 6.60% of covered payroll.

Benefit Formulas with Past Cola Adjustments

Runs #5, #6 and #7 present the estimated valuation results corresponding to Runs #2 through #4, respectively, with one major change. In Runs #5 through #7, amounts of pension payable to *current pensioners, deferred pensioners and survivors* have been increased by the *full percentage increase* experienced by the Consumer Price index (Canada, all items) from January 1 of the year in which the pension commenced to *January 1, 1975*, reduced, where applicable, by the amount of any ad hoc increases already granted up to and including January 1, 1975. In the case of pensions currently

being paid to surviving spouses of pensioners, the increase would be from the date of commencement of the pension to the retired C.N.R. employee. The results of these Runs are summarized in Table IX.

The principal results of Run #5 are an unfunded liability of \$1,284 million, a funded ratio of 44%, annual amortization payments over 30 years of \$114.3 million per annum and current service contributions by the Company of 6.20% of covered payroll.

The principal results of Run #6 are an unfunded liability of \$1,561 million, a funded ratio of 40%, annual amortization payments over 30 years of \$139.0 million per annum and current service contributions by the Company of 6.20% of covered payroll.

The principal results of Run #7 are an unfunded liability of \$1,725 million, a funded ratio of 37%, annual amortization payments over 30 years of \$153.6 million per annum and current service contributions by the Company of 6.60% of covered payroll.

Benefit Formulas with Past and Future Cola Adjustments

Runs #8, #9 and #10 present the results corresponding to Runs #2 through #4, respectively, with two major changes. First, the pensions payable as at January 1, 1975 to pensioners, deferred pensioners and survivors have been increased for *past increases* in the Consumer Price Index. In addition, both present and future pensions have been assumed to increase in line with *future increases* in the Consumer Price Index, for pensioners, deferred pensioners, survivors and current active employees. The results of these Runs are summarized in Table X.

The principal results of Run #8 are an unfunded liability of \$2,493 million, a funded ratio of 29%, annual amortization payments over 30 years of \$222.0 million per annum and current service contributions by the Company of 9.55% of covered payroll.

The principal results of Run #9 are an unfunded liability of \$2,937 million, a funded ratio of 26%, annual amortization payments over 30 years of \$261.6 million per annum and current service contributions by the Company of 9.55% of covered payroll.

The principal results of Run #10 are an unfunded liability of \$3,204 million, a funded ratio of 24%, annual amortization payments over 30 years of \$285.3 million per annum and current service contributions by the Company of 10.26% of covered payroll.

TABLE IX

*ANALYSIS OF RESULTS AS AT JANUARY 1, 1975
WITH PAST COLA ADJUSTMENTS*
(in millions of dollars)

	Run #5	Run #6	Run #7
<u>Description of Formulas</u>			
Pensioners, deferred pensioners and survivors	original	2%	2%
Active 1959 Plan members	current	current	current
Active 1935 plan members	current	current	2%
<u>Balance Sheet</u>			
Assets	\$1,020	\$1,020	\$1,020
Accrued liabilities	2,304	2,581	2,745
Unfunded liabilities	1,284	1,561	1,725
Funded ratio	44%	40%	37%
Annual amortization payment - 30 years	\$114.3	\$139.0	\$153.6
<u>Current Service Contributions for 1975</u>			
Employee	\$ 43.5	\$ 43.5	\$ 46.7
Company			
- \$	55.9	55.9	59.5
- % of covered payroll	6.20%	6.20%	6.60%
<u>Total Company Contributions for 1975</u>			
- \$	\$170.2	\$194.9	\$213.1
- % of covered payroll	18.89%	21.63%	23.65%

NOTES

a) See notes at bottom of Table VI for descriptions of COLA and of the "current", "original" and "2%" formulas.

b) The amortization calculation is based on the interest rate described in Table V.

c) The "Past" COLA adjustments do not apply to the active 1959 and 1935 plan members in Runs #5, #6, and #7.

TABLE X

*ANALYSIS OF RESULTS AS AT JANUARY 1, 1975
WITH PAST AND FUTURE COLA ADJUSTMENTS
(in millions of dollars)*

	<u>Run #8</u>	<u>Run #9</u>	<u>Run #10</u>
<u>Description of Formulas</u>			
Pensioners, deferred pensioners and survivors	original	2%	2%
Active 1959 Plan members	current	current	current
Active 1935 Plan members	current	current	2%
<u>Balance Sheet</u>			
Assets	\$1,020	\$1,020	\$1,020
Accrued liabilities	3,513	3,957	4,224
Unfunded liabilities	2,493	2,937	3,204
Funded ratio	29%	26%	24%
Annual amortization payment - 30 years	\$222.0	\$261.6	\$285.3
<u>Current Service Contributions for 1975</u>			
Employee	\$ 43.5	\$ 43.5	\$ 46.7
Company			
- \$	\$ 86.1	\$ 86.1	\$92.5
- % of covered payroll	9.55%	9.55%	10.26%
<u>Total Company Contributions in 1975</u>			
- \$	\$308.1	\$347.7	\$377.8
- % of covered payroll	34.19%	38.58%	41.92%

NOTES

- a) See notes at bottom of Table VI for descriptions of COLA and of the "current", "original" and "2%" formulas.
- b) The amortization calculation is based on the interest rates described in Table V.
- c) The "Past" COLA adjustments do not apply to the active 1959 and 1935 plan members in Runs #8, #9, and #10.

Benefit Formulas with "Delayed Indexing"

Runs #11 and #12 represent results corresponding to Runs #9 and #10, respectively, with one major difference. Rather than adopting indexing based on the *full increase* in the Consumer Price Index, these Runs present the results with a variation described as "delayed indexing". "Delayed indexing" is an innovative concept allowing for cost-of-living adjustments to past and future pensions for the full rate of past and/or future increases in the Consumer Price Index, *in excess of the first 25% drop in purchasing power*. This is equivalent to providing full indexing on 75% of the initial pension at retirement, after the initial 25% loss. The results of these Runs are summarized in Table XI.

The principal results of Run #11 are an unfunded liability of \$2,075 million, a funded ratio of 33%, annual amortization payments over 30 years of \$184.8 million per annum and current service contributions by the Company of 7.01% of covered payroll.

The principal results of run #12 are an unfunded liability of \$2,277 million, a funded ratio of 31%, annual amortization payments over 30 years of \$202.8 million per annum and current service contributions by the Company of 7.48% of covered payroll.

Explanation of Funded Ratio

This term "funded ratio" has been used to represent the ratio of the value of the assets on hand (\$1,020 million) to the accrued liabilities on each of the Runs. The funded ratio is a very rough indication of the degree of security of benefits enjoyed by plan members. If the plan were actually to be wound up, all benefits under the plan would be frozen (based on salaries and cost-of-living increases only up to the date of termination) and would presumably become fully vested. In that event, the funded ratio would likely be based on market values of assets, and liabilities would be determined using a "single premium" valuation method assuming no future salary increases and no employee turnover. The resulting funded ratios would likely be considerably higher than those presented in the above calculations.

Cost Estimates for Changes in Survivor Benefits

In addition to possible changes in benefit formulas and possible changes relating to cost-of-living indexing, my actuaries provided estimates of the cost of increasing the level of benefits for survivors of pensioners from the present level of 50% of the regular pension to 60%, 75% and 95% of the regular pension.

These estimates contemplated *no change* to the death benefits payable under the pension plans in respect of death *prior* to actual retirement.

TABLE XI

ANALYSIS OF RESULTS AS AT JANUARY 1, 1975
WITH "DELAYED INDEXING"
 (in millions of dollars)

	<u>Run #11</u>	<u>Run #12</u>
<u>Description of Formulas</u>		
Pensioners, deferred pensioners and survivors	2%	2%
Active 1959 Plan members	current	current
Active 1935 Plan members	current	2%
<u>Balance Sheet</u>		
Assets	\$1,020	\$1,020
Accrued liabilities	3,095	3,297
Unfunded liabilities	2,075	2,277
Funded ration	33%	31%
Annual amortization payment - 30 years	\$184.8	\$202.8
<u>Current Service Contributions for 1975</u>		
Employee	\$ 43.5	\$ 46.7
Company		
- \$	63.2	67.4
- % of covered payroll	7.01%	7.48%
<u>Total Company Contributions in 1975</u>		
- \$	\$248.0	
- % of covered payroll	27.52%	

NOTES

a) See notes at bottom of Table VI for descriptions of COLA and of the "current", "original" and "2%" formulas.

b) The amortization calculation is based on the interest rates described in Table V.

The results are presented below for certain "bench mark" Runs. The ones chosen for this purpose are Runs #1, #4, #5, #10, and #12

Results for 60% Survivor Pensions

The results for 60% pensions to survivors of *pensioners* are presented in Table XII.

TABLE XII

60% SURVIVOR PENSIONS
ANALYSIS OF RESULTS AS AT JANUARY 1, 1975
 (in millions of dollars)

	Run #1	Run #4	Run #5	Run #10	Run #12
<u>Balance Sheet</u>					
Assets	\$1,020	\$1,020	\$1,020	\$1,020	\$1,020
Accrued Liabilities	2,191	2,455	2,382	4,399	3,433
Unfunded Liabilities	1,171	1,435	1,362	3,379	2,413
Funded Ratio	47%	42%	43%	23%	30%
Annual Amortization Payment - 30 years	\$104.3	\$127.8	\$121.3	\$300.9	\$214.9
<u>Current Service Contributions for 1975</u>					
Employee	\$ 43.5	\$ 46.7	\$ 43.5	\$ 46.7	\$ 46.7
Company					
- \$	57.6	61.4	57.6	95.8	69.8
- % of covered payroll	6.39%	6.81%	6.39%	10.63%	7.74%
<u>Total Company Contributions in 1975</u>					
- \$	\$161.9	\$189.2	\$178.9	\$396.7	\$284.7
- % of covered payroll	17.96%	20.99%	19.85%	44.02%	31.59%

Results for 75% Survivor Pensions

The results for 75% pensions to survivors of *pensioners* are presented in Table XIII.

TABLE XIII

75% SURVIVOR PENSIONS
ANALYSIS OF RESULTS AS AT JANUARY 1, 1975
 (in millions of dollars)

	Run #1	Run #4	Run #5	Run #10	Run #12
<u>Balance Sheet</u>					
Assets	\$1,020	\$1,020	\$1,020	\$1,020	\$1,020
Accrued Liabilities	2,294	2,574	2,499	4,662	3,636
Unfunded Liabilities	1,274	1,554	1,479	3,642	2,616
Funded Ratio	44%	40%	41%	22%	28%
Annual Amortization					
Payment - 30 years	\$113.5	\$138.4	\$131.7	\$324.3	\$233.0
<u>Current Service</u>					
<u>Contributions for 1975</u>					
Employee	\$ 43.5	\$ 46.7	\$ 43.5	\$ 46.7	\$ 46.7
Company					
- \$	60.2	64.2	60.2	100.8	73.4
- % of covered payroll	6.68%	7.12%	6.68%	11.18%	8.14%
<u>Total Company</u>					
<u>Contributions in 1975</u>					
- \$	\$173.7	\$202.6	\$191.9	\$425.1	\$306.4
- % of covered payroll	19.27%	22.48%	21.29%	47.17%	34.00%

Results for 95% Survivor Pensions

The results for 95% pensions to survivors of *pensioners* are presented in Table XIV.

TABLE XIV

95% SURVIVOR PENSIONS
ANALYSIS OF RESULTS AS AT JANUARY 1, 1975
 (in millions of dollars)

	Run #1	Run #4	Run #5	Run #10	Run #12
Balance Sheet					
Assets	\$1,020	\$1,020	\$1,020	\$1,020	\$1,020
Accrued Liabilities	2,431	2,733	2,654	5,012	3,907
Unfunded Liabilities	1,411	1,713	1,634	3,992	2,887
Funded Ratio	42%	37%	38%	20%	26%
Annual Amortization Payment - 30 years	\$125.7	\$152.6	\$145.5	\$355.5	\$257.1
Current Service					
<i>Contributions for 1975</i>					
Employee	\$ 43.5	\$ 46.7	\$ 43.5	\$ 46.7	\$ 46.7
Company					
- \$	63.7	67.9	63.7	107.3	78.1
- % of covered payroll	7.07%	7.53%	7.07%	1.91%	8.67%
<i>Total Company</i>					
<i>Contributions in 1975</i>					
- \$	\$189.4	\$220.5	\$209.2	\$462.8	\$335.2
- % of covered payroll	21.02%	24.47%	23.21%	51.35%	37.19%

Explanation of Contribution Deficiencies

All of the accrued liabilities shown in this Part have been shown net of "contribution deficiencies". The approximate amounts of contribution deficiencies taken into account for the various Runs were as follows:

<i>Membership Group</i>	<i>Run #'s</i>	<i>Contribution Deficiencies</i>
Pensioners, deferred pensioners and survivors	3, 4, 6, 7, 9, 10, 11, 12	\$31 million
Active 1959 Plan members	all runs	\$35 million
Active 1935 Plan Members	4, 7, 10, 12	\$55 million

Explanation for the Choice of Amortization Schedule

The choice of an appropriate plan to finance the unfunded liabilities under the C.N.R. pension plans is a matter of *great importance*. As at January 1, 1975 my actuaries estimate that the funded ratio stands below 50% and the *unfunded liabilities* are approximately \$1.1 billion.

My terms of reference include the requirement to investigate and report with recommendations upon, among other things, the present and possible alternative bases of funding, notwithstanding existing statutory requirements.

As at January 1, 1973, the unfunded liabilities totalled \$744.5 million and those unfunded liabilities are currently being amortized in accordance with the Pension Benefits Standards Act (PBSA) Regulations by the following schedule of payments, based on interest at the rate of 7½% per annum:

1. \$22.04 million per annum to September 30, 2027.
2. \$1.45 million per annum to September 30, 1992.
3. \$5.20 million per annum to September 30, 1992.
4. \$6.61 million per annum to September 30, 1992.
5. \$4.11 million per annum to December 31, 1996.
6. \$1.785 million per annum to September 30, 1992.
7. \$22.91 million per annum to September 30, 1992.

According to that schedule, the anticipated unfunded liability as at January 1, 1975 would be approximately \$723 million. This is lower than the unfunded liability of \$1,102 million shown for Run #1 by \$379 million because of three factors:

1. The net financial experience of the plan during 1973 and 1974 was less favourable than had been assumed at December 31, 1972.
2. The January 1, 1975 valuation by my actuaries incorporated a number of changes in assumptions and in valuation methods which affected the estimate of the unfunded liabilities.
3. The January 1, 1975 liabilities reflect certain improvements in benefits which increased the unfunded liabilities.

Under the PBSA Regulations, the portion of the \$379 million due to the first factor is classified as an "experience deficiency" and must be amortized by equal annual payments over five years, or faster. The portion of the \$379 million due to the second and third factors is classified as an "initial unfunded liability" and must be amortized by equal annual payments to September 30, 1992, or faster.

As can be seen throughout this Part of my report, my actuaries have not estimated the costs of financing the unfunded liabilities using "minimum PBSA-type" schedules. In their view (and I concur in their judgement in the matter), it must be just about impossible for the plan members and their representatives to fully understand such a confusing financing schedule and the C.N.R. Board of Directors must also find it difficult to understand and carry out their duties relating to the sound financing of pension liabilities, beyond mere compliance with minimum legal standards. Of more immediate importance is that fact that the "minimum" funding schedule described on the last above is *not* likely, except by sheer accident, to eliminate the gap between the assets and the accrued liabilities of the plans.

A high proportion of the accrued liabilities are rapidly increasing because of a high level of increases in wages and salaries. However, most of these accrued liabilities are currently being amortized by a fixed series of payments at an interest rate which reflects a much lower level of inflation than is impacting on the liabilities.

As with most financing schedules, the important considerations for a plan for financing unfunded pension liabilities are the interest rate or rates, the amortization period, and the term.

If the liabilities are dynamic rather than fixed, the anticipated growth or decline in the liabilities for benefits accrued up to the valuation date must be incorporated in the financing schedule, either directly or, at least, by offsetting adjustments to the amortization interest rate. The unfunded liability is a debt owed to the fund and conservative financing requires the use of an amortization interest rate that errs on the high side, not the low side.

The choice of amortization period is a difficult, and subjective, one. The possible choices range from immediate payment of all unfunded liabilities to financing in perpetuity (paying interest and unanticipated increases only, to keep the unfunded liabilities from escalating, but not paying them off).

Immediate payment of all unfunded liabilities would require a single outlay of such magnitude that pension plans would seldom be able to make significant benefit improvements for pensioners or older workers in recognition of service prior to the date the improvements are adopted. On the other hand, financing in perpetuity seems somewhat undisciplined and imprudent considering the nature of the obligations and the many uncertainties involved, and would not reduce the annual amortization payment significantly below the level required for a 50-year amortization period.

In the view of my actuaries, considering the stature of the Canadian National Railways and the magnitude of the unfunded liabilities, an amortization period of 30 to 50 years would be appropriate. However, in view of the declining workforce and the uncertain prospects for the railroad in the 21st century, they are inclined to favour the lower end of this range and recommend an *amortization period of 30 years*. I concur with their recommendation.

It should be stressed that the *term* of the amortization schedule should *not* be allowed to exceed three years. In other words, the interest rate applicable to the amortization payments should be *re-assessed frequently*, particularly if inflation continues at its current high levels, or increases further.

In arriving at the recommended 30-year amortization schedules, they analyzed a number of alternative amortization periods for some of the various runs. This analysis is shown in Table XV.

It should be noted that the level annual amortization payments with respect to the unfunded liabilities represent a *reducing percentage* of covered payroll in future years. For the year 1994, Table XV shows the percentage of covered payroll on two bases: (a) a static workforce (and increasing payroll) projection; and (b) a declining workforce (but still an increasing payroll) projection. In case (b), the workforce has been assumed to decline by 2% per annum, compounded, from 1975 to 2000, inclusive, remaining constant in size thereafter.

Benefits from a Levy of 1% of Payrolls

In addition to estimating the costs of possible benefit improvements shown above, I asked my actuaries to provide estimates of certain improvements for current pensioners and possibly also to current active members which could be supported by a levy of 1% of existing payrolls, shared equally by current employees and the Company.

TABLE XV

*ALTERNATIVE AMORTIZATION PAYMENTS
WITH RESPECT TO THE UNFUNDED LIABILITIES*
(in millions of dollars and percentage of covered payroll)

	Run #1	Run #4	Run #5	Run #10	Run #12
level payments - 20 years					
- \$	\$114.8	\$141.2	\$133.8	\$333.9	\$237.3
- % in 1975	12.74%	15.67%	14.85%	37.05%	26.33%
- % in 1994					
(a) static work-force	3.38%	4.16%	3.94%	9.84%	6.99%
(b) declining workforce	5.07%	6.23%	5.90%	14.74%	10.47%
level payments - 30 years					
- \$	\$ 98.1	\$120.7	\$114.3	\$285.3	\$202.8
- % in 1975	10.89%	13.39%	12.68%	31.66%	22.50%
- % in 1994					
(a) static work-force	2.89%	3.56%	3.37%	8.41%	5.98%
(b) declining workforce	4.33%	5.33%	5.04%	12.59%	8.95%
level payments - 40 years					
- \$	\$ 91.1	\$112.0	\$106.1	\$264.8	\$188.2
- % in 1975	10.11%	12.43%	11.77%	29.38%	20.88%
- % in 1994					
(a) static work-force	2.68%	3.30%	3.13%	7.80%	5.55%
(b) declining workforce	4.02%	4.94%	4.68%	11.69%	8.31%
level payments - 50 years					
- \$	\$ 87.7	\$107.9	\$102.2	\$255.0	\$181.3
- % in 1975	9.73%	11.97%	11.34%	8.30%	20.12%
- % in 1994					
(a) static work-force	2.58%	3.18%	3.01%	7.51%	5.34%
(b) declining workforce	3.87%	4.76%	4.51%	11.25%	8.00%

NOTE: The amortization payments are based on the interest rates noted in Table V. Average wages and salaries have been assumed to increase at the average wage and salary increase rates noted in Table V.

More specifically, I requested them to determine whether such a levy would be sufficient to provide for a full "past COLA adjustment" for current pensioners, deferred pensioners and survivors. I asked that if the levy were not sufficient to provide the full past COLA adjustment for current pensioners, deferred pensioners and widows, that they examine two alternatives:

- a) provision of a uniform percentage (e.g., 70%) of the full increase or,
- b) provision of full cost-of-living increases in excess of the first X% (e.g., 25%) drop in purchasing power.

I also asked that if the levy were more than sufficient to provide the full retroactive cost-of-living increase for present pensioners and widows, to determine what level of future cost-of-living increase might be provided for current and future pensioners and beneficiaries from the portion of the levy not required for the "past COLA adjustment" to current pensioners, deferred pensioners and widows.

Their calculations were based on a permanent levy of $\frac{1}{2}\%$ of earnings to active members and $\frac{1}{2}\%$ of total covered payroll to the Company in each year commencing with 1975.

Results of Calculations

They presented two estimates of these benefit improvements - one based on a static workforce, the other on a declining workforce. For the *declining workforce calculations*, the workforce has been assumed to decline by 2% per annum compounded, from 1975 to 2000, inclusive, remaining constant in size thereafter.

These estimates relate to cost-of-living adjustments *only*. They do not consider any change in the *benefit formula* for pensioners and survivors, *nor for 1935 Plan members*.

1. *Static workforce results.* On the basis of the static workforce projections, it would be possible to provide either:

- a) the full "past COLA adjustments" for *current pensioners, deferred pensioners and surviving spouses plus 29% of the full "future COLA adjustments"* for *current pensioners and beneficiaries and current active plan members*, or
- b) the full cost-of-living increases in excess of the first 30% drop in purchasing power ("delayed COLA") for *current pensioners and beneficiaries and current active plan members*.

2. *Declining workforce results.* On the basis of the declining workforce projections, it would be possible to provide either:

- a) the full "past COLA adjustments" for *current pensioners, deferred pensioners and surviving spouses* plus 15% of the full "future COLA adjustments" for *current pensioners and members*, or
- b) the full cost-of-living adjustments in excess of the first 35% drop in purchasing power ("delayed COLA") for *current pensioners and beneficiaries and current active plan members*.

In order to maintain these improved benefit provisions for future new entrants to the plans, the *current service contribution rate for new entrants* would change over the next 30 to 40 years, by varying amounts, depending on which of the options may be adopted. For the options shown here, the increase in the current service contribution rate for *new entrants* required to maintain the improved benefits would be *relatively small* and would be *more than offset* by the decrease in the rate for new entrants due to integration with the Canada Pension Plan for all years of service.

The idea of benefit improvements, particularly for current pensioners, deferred pensioners and surviving spouses, based upon this kind of levy is an interesting concept and I shall be developing it further at a later stage in my report.

Sensitivity Tests

A great deal of judgement goes into the selection of actuarial methods, assumed rates of retirement, and economic assumptions for valuation and cost-estimating purposes. The objective always is to select methods and formulate assumptions in a fair and reasonable manner, using the best data and information available.

Nevertheless, different actuaries do make different judgements (the discipline is an *art*, not a science) and it is therefore of interest to look at a range of methods and assumptions. My actuaries performed a number of calculations to "test" the sensitivity of their results to certain changes in benefit and contribution limits, actuarial method, assumed rates of retirement, and economic assumptions. The results of these sensitivity tests are presented in Appendix 4.

These sensitivity studies test the results of 8 changes in methods and assumptions and while I have not included them in the main body of my report, the following extract concerning a reasonable range of results is important.

Extract from Appendix 4

In our view (Paterson, Cook limited), it would be quite reasonable and appropriate for the Company to follow a funding pattern based on actuarial assumptions different from those on which our main body of valuation results and cost estimates have been prepared. There may be differences of professional opinion as to appropriate

assumptions and methods, and the Company may well choose to adopt a greater degree of conservatism than that which we used for the presentation of results to the Commission of Inquiry.

Based on the sensitivity results in this Section of the report, it would seem to us that there is a fairly wide range of reasonable estimates which could be followed for funding purposes. For example, for Run #1, Run #4 and Run #10, the following might be considered a reasonable range of results for funding purposes:

	<u>Run #1</u>	<u>Run #4</u> (in millions of dollars)	<u>Run #10</u>
<u>Balance Sheet</u>			
Assets	\$1,020	\$1,020	\$1,020
Accrued Liabilities	\$2,100 - \$2,300	\$2,300 - \$2,600	\$4,100 - \$5,000
Unfunded Liabilities	1,080 - 1,280	1,280 - 1,580	3,080 - 3,980
Funded Ratio	49% - 44%	44% - 39%	25% - 20%
Annual Amortization Payment - 30 years	\$94 - \$111	\$111 - \$137	\$268 - \$346
<u>Current Service Contributions for 1975</u>			
Employee Company	\$43.5	\$46.7	\$46.7
- \$	\$54 - \$72	\$58 - \$77	\$90 - \$126
- % of covered payroll	6.0% - 8.0%	6.4% - 8.5%	10.0% - 14.0%
<u>Total Company Contributions for 1975</u>			
- \$	\$148 - \$183	\$169 - \$214	\$358 - \$472
- % of covered payroll	16.4% - 20.3%	18.8% - 23.7%	39.7% - 52.4%

C.P.R. Pension Plan

As indicated earlier, this part of my report must of necessity duplicate much of the narrative and explanation just completed.

Analysis of Assets

This section analizes the present structure of the Pension Trust Fund assets, the recent rates of return on the invested assets, and the relative performance of the Canadian Pacific Limited Fund compared with other pension funds.

To illustrate the relative magnitude of the contributions, income and disbursements of the Fund, Table XVI shows the development of the Fund in the year 1974.

TABLE XVI

DEVELOPMENT OF PENSION TRUST FUND

		\$ Millions
Book Value of Fund at December 31, 1973		<u>\$652.3</u>
Contributions: By Employees	22.8	
By C.P.R.	<u>52.4</u>	75.2
Investment Income:		36.2
Disbursements: Refunds to Employees	3.5	
Pensions Paid	52.4	
Administration	<u>.9</u>	(56.8)
Net change in amounts transferable to the Pension Funds		<u>.2</u>
Book Value of Fund at December 31, 1974		<u><u>\$707.1</u></u>

NOTE: The values shown above are on an accrual basis; that is, they include amounts receivable and benefits payable.

Table XVII shows the breakdown of C.P.R. Pension Trust Fund assets as at December 31, 1974, by major asset category in terms of book value and market values.

TABLE XVII

*BREAKDOWN OF PENSION FUND
INVESTMENTS BY TYPE
AT DECEMBER 31, 1974*

	<u>Book Value</u> \$ Millions	<u>% of Total</u> Book Value	<u>Market Value</u> \$ Millions	<u>% of Total</u> Market Value
Bonds	\$377.1	53%	\$284.7	49%
Stocks	238.1	34%	206.0	36%
Mortgages (at book value)	42.9	6%	42.9	7%
Short-Term Investments and Cash	47.9	7%	47.9	8%
TOTAL	\$706.0	100%	\$581.5	100%

The rates of investment return achieved by the Pension Trust Fund in recent years are shown below. The yields have been determined on a market value basis and recognize realized and unrealized capital gains and losses as well as investment income.

<i>Year</i>	<i>Annual Rate of Return</i>
1970	10.91%
1971	12.30%
1972	14.93%
1973	0.17%
1974	-10.37%

The effective yield achieved on the invested assets over the five years from January 1, 1970 to December 31, 1974 is equivalent to a constant rate of return of 5.04% per annum.

The comparative investment performance study produced by A.G. Becker (Canada) Limited indicates that the Canadian Pacific Limited Fund has achieved results over the last four or five years which are at the first quartile level of all funds included in their study, depending on the time period chosen.

Valuation of Assets

There are several asset valuation methods in current use for pension plan actuarial valuations. These include, separately and in combination, market value, book value (cost or amortized cost), capitalized values based on discounting future anticipated receipts from the investments, and a variety of "write-up" methods for linking asset values at the end of a plan year to the value at the end of the preceding year in accordance with a formula. For the last valuation of the Canadian Pacific Limited Pension Plan, the assets of the Pension Trust Fund were valued using a "write-up" method to value equity investments and a discounting of future anticipated receipts to value fixed income investments.

Each asset valuation method can produce reasonable results if used together with appropriately corresponding economic assumptions for the valuation of the plan's liabilities. For example, if current interest rates are abnormally high, the current assets of the plan would be fully valued (full cost or amortized cost) at book but current market value would be below book value. In this case, it would be appropriate to assume higher future investment returns based on market values than on book, at least for as long as the abnormally high interest rates are expected to prevail. Conversely, if market value exceeds book value, it would be logical and appropriate in valuing the liabilities to use a lower assumption as to future investment returns if the pension plan assets are valued at market than if the assets are valued at book.

Both interest rates and market values of securities are subject to erratic variations due to random market fluctuations. It is therefore impossible to be absolutely precise in selecting an appropriate combination of asset values and economic assumptions. The best one can do is to pick *fair and reasonable* values based on the most relevant data available.

For the purpose of the Canadian Pacific Limited valuation and cost estimates for my Inquiry, my actuaries proposed to value the assets using the approximate market value of the assets of the Canadian Pacific Limited Trust Fund as at December 31, 1974, adjusted to reduce the effect of chance market fluctuations. Consistent with this, in valuing the liabilities they propose to use economic assumptions which project current economic circumstances for the short term, and more normal circumstances in the longer term. The economic assumptions are detailed later in this Part of the report. I accept these proposals as being fair and reasonable.

Assets as Reported

Table XVIII shows the book and market values of assets as at December 31, 1974 as reported to the Commission by Canadian Pacific Limited. Both totals include mortgages actually valued at book.

TABLE XVIII

*ASSETS AT DECEMBER 31, 1974
AS REPORTED BY C.P.R.*

	<u>Book Value</u>	<u>Market Value</u>
Bonds	\$377,140,000	\$284,687,000
Stocks	238,107,000	205,980,000
Mortgages	42,906,000	42,906,000
Short-term investments and cash, net receivables, and payables	<u>48,923,000</u>	<u>48,923,000</u>
	<u>\$707,076,000</u>	<u>\$582,496,000</u>

Mortgage Adjustment

To adjust the mortgages to approximate their true market value at December 31, 1974, my actuaries multiplied the book value by 90% resulting in an approximate market value of \$38,615,000 for the mortgage portion of the portfolio. The 90% factor was based on the average annual rate of return on book value, the average duration to maturity and on the fact that prevailing new mortgage yields at December 31, 1974 were in excess of 11½%.

Trend Line Adjustments

It was then necessary to adjust the market values at December 31, 1974 to reduce the effect of chance market fluctuations in the stock market and in prevailing bond and mortgage values. This was accomplished by increasing the market values of bonds, stocks, and mortgages by 3%, 15%, and 5%, respectively. These factors were determined by examination of the long-term trend of the Toronto Stock Exchange (TSE) Industrial Index and of several indices of bond and mortgage interest rates. Our examination indicated that the TSE index was below the trend line and interest rates were

above their trend lines on December 31, 1974. The 3%, 15%, and 5% adjustments increase the market values of the respective classes of securities to an approximation of the underlying market values at December 31, 1974, without chance market fluctuations.

The results of the adjustments are as follows:

TABLE XIX

*MARKET VALUE OF ASSETS AT DECEMBER 31, 1974
WITH ADJUSTMENTS*

	Actual Market Value	Market Value Adjusted for Trend Line
Bonds	\$284,687,000	\$293,228,000
Stocks	205,980,000	236,877,000
Mortgages	38,615,000*	40,546,000
Short-term investments and cash, net receivables, and payables	48,923,000	48,923,000
	<u>\$578,205,000</u>	<u>\$619,574,000</u>

* Approximate.

On the basis of this analysis, I propose to place a value of \$620,000,000 on the assets of the Canadian Pacific Limited Pension Trust Fund as at December 31, 1974. In my opinion, this is a fair and reasonable valuation of the assets for these purposes and it is consistent with the economic assumptions to be used in valuing the liabilities under the Canadian Pacific Limited Pension Plan as of the same date. This valuation is 7% above market values and 12% below book values as at December 31, 1974.

Valuation of Liabilities

In valuing the liabilities of the C.P.R. plan and preparing cost estimates, my actuaries emphasized the long-term cost implications by using a level contribution actuarial method for all cost estimates. They examined alternative short-term actuarial methods for only one or two of the cost estimates, for comparison funding strategies for only one or two of the cost estimates, for comparison

purposes. They also took into account the whole cost of the benefits and ignore, for purposes of the cost estimates, possible consideration of a government subsidy towards the cost of part of the benefits.

For estimates of the level of benefits to be supported by a given increase in the level of contributions, they prepared two estimates, one based on a static workforce and the other on a declining workforce. For all other estimates, they used a "closed group" valuation based on the benefits and costs for the present group of members, pensioners and beneficiaries to determine the estimates of normal cost and unfunded liabilities.

To remove a degree of arbitrariness from the selection of the appropriate length of the amortization period for the unfunded liabilities, they reviewed the financial impact of the amortization schedule on the basis of both the static and declining work force projections before forming an opinion on the most appropriate amortization schedule.

It is my opinion that these procedures are both appropriate and practical, considering the very long-term nature of the plan, the likelihood of a declining workforce in the railroad industry and the number of cost estimates prepared.

Specifically, they used the Entry Age Normal valuation method to determine the normal costs and unfunded liabilities. The amortization schedules for the respective unfunded liabilities would be determined after the unfunded liabilities have been calculated, as described above.

As a test of the reasonableness of our proposed approach they examined the recommendations relating to actuarial methods and funding of both the Commission on Railroad Retirement and its Actuarial Advisory Panel in their Report to the President and the Congress of the United States of America dated June 30, 1972. This report discusses, in some detail, concepts of actuarial soundness and their application to pension plans covering declining work forces in general and the U.S. railroad system in particular.

The approach taken by my actuaries is consistent in principle with the report of the Commission on Railroad Retirement and its Actuarial Advisory Panel, with difference in detail to reflect the differences between the railroad pension systems of the two countries. In particular, Recommendation 10-2(c) reads as follows:

"(c) In the longer-run, as soon as some degree of normality in the system's finances is restored, a financing plan providing for a more substantial degree of actuarial soundness should be adopted. Such a plan should provide for reserves to cover the liabilities of the system to present members of the system more fully, ideally by a plan for amortization of the accrued unfunded liabilities of the system; e.g., over 30 years."

Actuarial Assumptions

The following comments on actuarial assumptions are divided into two sub-topics, economic assumptions and demographic assumptions.

Economic Assumptions

In determining appropriate economic assumptions, my actuaries have been guided to some extent by Dr. Deutsch's analysis of future economic circumstances, and to some extent by Boyle, Brooks-Hill and Paterson's empirical study of past (1924-1973) Canadian wage increases, price increases and rates of returns on bonds and stocks discussed in Appendix D. They have also consulted a number of other economic studies and have reviewed more current statistics taken from Statistics Canada's CAN-SIM Socio-Economic data base.

The economic assumptions used are displayed in Table XX with comparative figures taken from the Deutsch Commission Report.

TABLE XX

ECONOMIC ASSUMPTIONS

	Proposed Economic Assumptions			Deutsch
	1975 to 1979	1980 to 1984	1985 and Later	1973 Assumptions All Years
<i>Annual Rate of:</i>				
Increase in Consumer Price Index	8%	5½%	3%	3½%
Increase in Average Wages and Salaries	10%	7½%	5%	6½%
Return of Pension Fund Assets	10%	8½%	6½%	8%

Comparisons with Previous Assumptions

The major difference between these proposed economic assumptions and the Deutsch Commission assumptions is the reduction in the long-term normal differential

between average wage and salary increases and price increases from 3% to 2%. I am satisfied that the 2% differential is justified on the basis of both past experience and future prospect. These assumptions attempted to reflect current economic patterns for the next few years, gradually modifying into the long-term pattern by 1985.

For additional comparison, the economic assumptions employed in the valuation report on the Canadian Pacific Limited Pension Plan as at December 31, 1972 were as follows:

Annual Rates of:

Price Increase	Not applicable
General Wage and Salary Increase	4 1/4 %
Return on Assets	6 1/2 %

YMPE Projection

Consistent with the current statute, my actuaries assumed that the Year's Maximum Pensionable Earnings (YMPE) under the Canada Pension Plan will increase at the rate of 12 1/2% per annum from its current base (1975 - \$7,400) until it catches up with an index on the Statistics Canada Industrial Composite of average weekly wages and salaries, annualized (June 1975 \$10,563). Based on the economic assumptions set out above, the catch-up will take place in 1986. Beyond that year, my actuaries assumed annual increases in the YMPE of 5% per annum consistent with the economic assumptions noted above. This approach is similar to that followed in the Deutsch Commission Report. In the December 31, 1972 valuation of the Canadian Pacific Limited Pension Plan, it was assumed that the YMPE would increase by 12 1/2% per annum until 1979 and thereafter by 4 1/4% per annum.

In addition to the foregoing economic assumptions, they assumed that administrative expenses of 5% of employee contributions will be charged to the Pension Trust Fund each year.

Demographic Assumptions

As outlined earlier in this report, in examining the past actuarial methods and the basis for funding of both the C.N.R. and the C.P.R. pension plans, and in responding to the four questions posed by me as possible amendments to these plans, my actuaries conducted a thorough analysis of the demographic assumptions used in the most recent valuation of the plans. This analysis included such important categories as salary increase rates, post-retirement mortality rates, and employee turnover rates.

In some areas of analysis they endorse the assumptions used in the most recent evaluations of the plans; in other areas they propose the adoption of differing demographic assumptions, particularly in determining the liabilities and cost estimates involved in assessing the impact of possible amendments to the plans. This work is extremely important but it is highly technical in nature and I therefore do not intend to include it in the body of my report. The results of these studies are available however to anyone who wishes them for examination.

*Valuation Results and Cost Estimates for Possible
Amendments to the C.P.R. Plan*

I asked my actuaries to estimate the cost implications of four questions, as possible amendments to the pension plan. The detailed interpretation of these questions is set-out below for the C.P.R. plan. (This description is essentially the same as that contained from pages IV17 to IV-20, modified as appropriate to reflect differences between the C.N.R. and the C.P.R. plans.)

1. *"What would it cost the Canadian Pacific Limited Pension Plan to implement a cost-of-living adjustment for current pensioners?"*

My actuaries examined the cost of providing an increase, effective January 1, 1975, in *all* pensions then in payment to pensioners, survivors and estates. In each case, the increase would be the full percentage increase experienced by the Consumer Price Index (Canada, all items – published by Statistics Canada) from January 1 of the year in which the pension commenced to January 1, 1975, adjusted to remove duplication of increases already granted. In the case of a pension in payment to the spouse of a deceased pensioner, the increase would be from the date of retirement of the pensioner.

In addition to providing cost information on the single retroactive adjustment up to January 1, 1975, they prepared cost estimates for providing *future* cost-of-living increases in pensions for pensioners, deferred pensioners, survivors and current active employees.

These cost estimates were prepared both with and without the changes considered in question 2 below.

2. *"What would it cost to apply the 2% formula to currently-retired Canadian Pacific Limited employees?"* The revised pensions have been calculated on the basis of the final average/best average earnings base now used for active employees and a formula of 2% of such earnings now used for active employees and a formula of 2% of such earnings for each year of service up to a maximum of 35 years, less 0.7% of earnings up to the "Average Maximum Pensionable Earnings" for each year of active service after January 1, 1966.

The 50% pensions were also re-calculated for spouses and estates, following the same rules.

Liabilities for terminated employees currently entitled to deferred pensions and current pensioners whose pensions had earlier been deferred were also re-calculated.

3. *"What would it cost to increase the level of benefits for widows and survivors of pensioners to 60%, 75% and 95% of the entitlement of the pensioner?"* The Canadian Pacific Limited Pension Plan now provides for survivor benefits to eligible widows and dependent widowers in the event of the death of a pensioner or any employee. My actuaries examined the cost of providing, for deaths which occur on or after January 1, 1975, benefits to surviving spouses rather than only to widows and dependent widowers.

They then examined the cost of providing an increase in the size of the survivor benefits from the present level of 50% of the regular pension to 60%, 75% and 95% of the regular pension, to each of the following:

- a) deceased pensioners' widows, widowers and estates currently in receipt of 50% pensions
- b) widows, widowers and estates of current pensioners at January 1, 1975
- c) future widows, widowers and estates of present active members and terminated employees currently entitled to deferred pensions.

They examined the cost of providing this increased benefit alone, and also in combination with the improvements set forth in question 1, and in questions 1 and 2 combined.

They have not examined any changes to the death benefits payable under the Pension Plan in respect of death prior to actual retirement other than applying the benefit equally to widows and widowers.

They also examined the cost of removing the "re-marriage clause" with respect to survivor benefits.

4. *"What improvements in the level of benefits for current pensioners can be supported by a levy of 1% of existing payrolls, shared equally by current employees and the Company?"* This type of improvement might apply instead of, but not in addition to, the improvements discussed in questions 1, 2, and 3 above.

There are various approaches that could be adopted in providing benefit improvements supported by such a levy. The most obvious would be to provide a

retroactive cost-of-living improvement, as discussed in question 1 above, for all present pensioners, deferred pensioners, spouses and estates. The levy of 1% of existing payrolls would be a permanent one and would apply to the existing payrolls as they increase or decrease over the years. In other words, it would be a permanent levy of $\frac{1}{2}\%$ of earnings to active members and $\frac{1}{2}\%$ of the total payroll to the Company.

Two estimates of this possible benefit improvement were prepared, one based on a static workforce, the other on a declining workforce.

In addition to these possible amendments, my actuaries examined the concept of "delayed" cost-of-living indexing. Under this concept, which is in my experience a unique innovation in pension plan design, the pensioner (or his spouse or dependents, in the case of a survivor's pension) would absorb the first 25 - 30% of lost purchasing power arising from inflation. After that defined or prescribed level of loss, the pension plan would absorb all future losses, with a guarantee to the pension recipient that the real value of the pension would not be eroded beyond the prescribed level.

The main body of results of the actuarial valuation and cost estimates, as at January 1st, 1975 under the C.P.R. pension plan are set-out in the following pages. These results are based on the actuarial methods and assumptions described above and on the valuation of assets described earlier.

The analysis led to a number of computer "runs" for alternative benefit formulas for the following groups:

- a) Pensioners, deferred pensioners and survivors,
- b) Active Plan members.

For comparative purposes, Runs #3, 4, 5, 6, 7, and 8 of this analysis are equivalent to Runs #4, 5, 7, 8, 10, and 12 in the C.N.R. analysis. The descriptions of alternative benefit formulas provided in Table VI apply with appropriate amendments, to the analysis of the C.P.R. plan.

Table XXI contains a brief description of the employee data which the valuation and cost estimates were based. Appendix 5 contains considerably more detail on the employee data used and some observations by my actuaries on the quality of the data and methods used to test its reliability.

Table XXII outlines the alternative benefit formulas considered and the respective "run" numbers for each combination of benefit formulas. The reader should make certain that the terminology is understood before interpreting the results.

TABLE XXI

VALUATION FILE - JANUARY 1, 1975
AGE, SERVICE AND EARNINGS SUMMARY

Group	Number of Employees	Annual Rate of Earnings	Average Years of Service*		Average Annual Rate of Earnings	Proportion of Females
			Average Age*	Service*		
Group	Number of Pensions	Total Monthly Pensions	Average Age	Average Years Since Retirement	Average Monthly Pension	Proportion of Widows
Active Employees	41,635	\$517,139,530	40.8	16.2	\$12,421	4.6%
Deferred Pensioners	998	N/A	55.2	3.7	N/A	11.2%
Pensioners and Survivors	24,066	\$4,432,381	72.0	9	\$184	31.2%

*The average age and average service figures differ to some degree from those in preliminary studies due to different rounding procedures.

TABLE XXII

SUMMARY OF ALTERNATIVE BENEFIT FORMULAS

Description of Benefit Formula

Membership Group	With Past COLA Adjustments				With Future COLA Adjustments				With "Delayed Indexing" Run ± 7			
	Run ± 1	Run ± 2	Run ± 3	Run ± 4	Run ± 5	Run ± 6	Run ± 7	Run ± 8	original	2%	original	2%
Pensioners, deferred pensioners and survivors	current	original	2%	original	2%	original	2%	original	current	current	current	current
Active Plan members	current	original	current	current	current	current	current	current	current	current	current	current

NOTES

a) "COLA" refers to cost-of-living adjustments based on the full rate of past and/or anticipated future changes in the Consumer Price Index. The "Past" COLA adjustments apply only to pensioners and survivors. The "Future" COLA adjustments apply to pensioners, deferred pensioners, survivors and to active members.

b) The "current" formula refers to the present level of benefits being received by pensioners and survivors and to the present benefit formulas for active plan members. For active plan members, the current formula and the "2%" formula are identical.

c) The "original" formula for current pensioners and survivors refers to the benefit formula which was in effect at the date of retirement or of the spouse's death, respectively.

d) The "2%" formula refers to the benefit formula currently in effect for active plan members.

e) "Delayed indexing" is a variation on COLA in which adjustments are made for the full rate of past and/or future increase in the Consumer Price Index, *in excess of the first 25% drop* in purchasing power of the pension.

Benefit Formulas without Cola Adjustments

Table XXIII presents the valuation results and cost estimates as at January 1st, 1975 for Runs #1, 2, and 3 without consideration of any possible cost-of-living adjustments.

Run #1 is a summary of the results of an actuarial valuation of the Canadian Pacific Limited Pension Plan as at January 1, 1975. The principal results of that valuation are an unfunded liability of \$763 million, a funded ratio of 45% and a current service contribution rate of 5.08% of covered payroll. If the unfunded liability were to be amortized by equal annual payments over a period of 30 years, the resulting annual amortization payment would be \$67.9 million per annum, *in addition to* the current service contributions in each year. Thus, for 1975, the total payment by the Company would amount to \$93.9 million which would represent a total of 18.33% of covered payroll.

The current service contribution rate as a percentage of payroll would remain relatively constant from year to year in the future but the annual amortization payment would represent a decreasing percentage (e.g., 13.25% in 1975, 5.27% in 1994 using declining workforce projections) of covered payroll from year to year and would completely vanish at the end of 30 years on the basis of the actuarial assumptions adopted. A more detailed analysis of the results of Run #1 is contained in Appendix 6.

Run #2 represents the valuation results if no change were made to the benefit formulas for active members but the pension in payment to pensioners and survivors were reduced to the amounts which were originally granted to each of them on their respective dates of retirement. The purpose of this Run is to indicate the value of the pension adjustments which *have been granted up to and including* January 1, 1975. The principal results of Run #2 are an unfunded liability of \$746 million, a funded ratio of 45%, annual amortization payments over 30 years of \$66.4 million per annum and current service contributions by the Company of 5.08% of covered payroll.

Run #3 represents an estimate of the valuation results if the benefits for pensioners, deferred pensioners and survivors were re-calculated on the 2% formula which is currently in effect for active Plan members. The principal results of Run #3 are an unfunded liability of \$891 million, a funded ratio of 41%, annual amortization payments over 30 years of \$79.3 million per annum and current service contributions by the Company of 5.08% of covered payroll.

Benefit Formulas with Past Cola Adjustments

Runs #4 and #5 present the estimated valuation results corresponding to Runs #2 and #3, respectively, with one major change. In Runs #4 and #5, amounts of pension, as determined by the applicable formula, payable to *current pensioners, deferred pensioners and survivors* have been increased by the *full* percentage increase experienced by the Consumer Price Index (Canada, all items) from January 1 of the year in

TABLE XXIII

*ANALYSIS OF RESULTS AS AT JANUARY 1, 1975
WITHOUT COLA ADJUSTMENTS*
(in millions of dollars)

	Run #1	Run #2	Run #3
<u>Description of Formulas</u>			
Pensioners, deferred pensioners and survivors	current	original	2%
<u>Active Plan members</u>			
Balance Sheet	current	current	current
Assets	\$ 620	\$ 620	\$ 620
Accrued liabilities	1,383	1,366	1,511
Unfunded liabilities	763	746	891
Funded ratio	45%	45%	41%
Annual amortization payment - 30 years	\$ 67.9	\$ 66.4	\$ 79.3
<u>Current Service Contributions for 1975</u>			
Employee	\$ 23.2	\$ 23.2	\$ 23.2
Company			
- \$	26.0	26.0	26.0
- % of covered payroll	5.08%	5.08%	5.08%
<u>Total Company Contributions for 1975</u>			
- \$	\$ 93.9	\$ 92.4	\$ 105.3
- % of covered payroll	18.33%	18.04%	20.56%

NOTES

a) See notes at bottom of Table XXII for descriptions of COLA and of the "current", "original" and "2%" formulas.

b) The amortization calculation is based on the interest rates described earlier.

which the pension commenced to *January 1, 1975*. In the case of pensions currently being paid to surviving spouses of pensioners, the increase would be from the date of commencement of the pension to the retired Canadian Pacific Limited employee. The results of these Runs are summarized in Table XXIV.

TABLE XXIV

*ANALYSIS OF RESULTS AS AT JANUARY 1, 1975
WITH PAST COLA ADJUSTMENTS* (in millions of dollars)

	<u>Run #4</u>	<u>Run #5</u>
<u>Description of Formulas</u>		
Pensioners, deferred pensioners and survivors	original	2%
Active Plan members	current	current
<u>Balance Sheet</u>		
Assets	\$ 620	\$ 620
Accrued liabilities	1,547	1,774
Unfunded liabilities	927	1,154
Funded ratio	40%	35%
Annual amortization payment - 30 years	\$ 82.6	\$102.8
<u>Current Service Contributions for 1975</u>		
Employee	\$ 23.2	\$ 23.2
Company		
-\$	26.0	26.0
-% of covered payroll	5.08%	5.08%
<u>Total Company Contributions for 1975</u>		
-\$	\$1086	\$128.8
-% of covered payroll	21.20%	25.15%

NOTES

- a) See notes at bottom of Table XXII for descriptions of COLA and of the "current", "original" and "2%" formulas.
- b) The amortization calculation is based on the interest rates described earlier.
- c) The "Past" COLA adjustments do not apply to the active plan members in Run #4 and Run #5.

The principal results of Run #4 are an unfunded liability of \$927 million, a funded ratio of 40%, annual amortization payments over 30 years of \$82.6 million per annum and current service contributions by the Company of 5.08% of covered payroll.

The principal results of Run #5 are an unfunded liability of \$1,154 million, a funded ratio of 35%, annual amortization payments over 30 years of \$102.8 million per annum and current service contributions by the Company of 5.08% of covered payroll.

Benefit Formulas with Past and Future Cola Adjustments

Runs #6 and #7 present the results corresponding to Runs #2 and #3, respectively, with two major changes. First, the pensions payable as at January 1, 1975 to pensioners, deferred pensioners and survivors have been increased for *past increases* in the Consumer Price Index. In addition, both present and future pensions have been assumed to increase in line with *future increases* in the Consumer Price Index, for pensioners, deferred pensioners, survivors and current active employees. The results of these Runs are summarized in Table XXV.

The principal results of Run #6 are an unfunded liability of \$1,723 million, a funded ratio of 26%, annual amortization payments over 30 years of \$153.4 million per annum and current service contributions by the Company of 6.60% of covered payroll.

The principal results of Run #7 are an unfunded liability of \$2,075 million, a funded ratio of 23%, annual amortization payments over 30 years of \$184.8 million per annum and current service contributions by the Company of 6.60% of covered payroll.

Benefit Formulas with "Delayed Indexing"

Run #8 represents the results corresponding to Run #7, with one major difference. Rather than adopting indexing based on the full increase in the Consumer Price Index, these Runs present the results with a variation described as "delayed indexing". This concept was described earlier on page IV-31. The results of this Run are summarized in Table XXVI.

The principal results of Run #8 are an unfunded liability of \$1,481 million, a funded ratio of 30%, annual amortization payments over 30 years of \$131.9 million per annum and current service contributions by the Company of 4.75% of covered payroll.

TABLE XXV

*ANALYSIS OF RESULTS AS AT JANUARY 1, 1975
WITH PAST AND FUTURE COLA ADJUSTMENTS
(in millions of dollars)*

	<u>Run #6</u>	<u>Run # 7</u>
<u>Description of Formulas</u>		
Pensioners, deferred pensioners and survivors	original	2%
Active Plan members	current	current
<u>Balance Sheet</u>		
Assets	\$ 620	\$ 620
Accrued Liabilities	2,343	2,695
Unfunded Liabilities	1,723	2,075
Funded Ratio	26%	23%
Annual amortization payment -30 years	\$153.4	\$184.8
<u>Current Service Contributions for 1975</u>		
Employee	\$ 23.2	\$ 23.2
Company		
- \$	33.8	33.8
- % of covered payroll	6.60%	6.60%
<u>Total Company Contributions for 1975</u>		
- \$	\$187.2	\$218.6
- % of covered payroll	36.55%	42.68%

NOTES

- a) See notes at bottom of Table XXII for descriptions of COLA and of the "current", "original" and "2%" formulas.
- b) The amortization calculation is based on the interest rates described earlier.
- c) The "Past" COLA adjustments do not apply to the active plan members in Run #6 and Run #7.

d) The method of calculating COLA adjustments on the deferred pensions of members who terminate their employment differs from that used in the C.N.R. cost estimates. If the same method had been followed, the Company's current service contribution rate for Runs #6 and #7 would have been 6.98% rather than 6.60%.

TABLE XXVI

*ANALYSIS OF RESULTS AS AT JANUARY 1, 1975
WITH "DELAYED INDEXING"
(in millions of dollars)*

	Run #8
<u>Description of Formulas</u>	
Pensioners, deferred pensioners and survivors	2%
Active Plan members	current
<u>Balance Sheet</u>	
Assets	\$ 620
Accrued liabilities	2,101
Unfunded liabilities	1,481
Funded ratio	30%
Annual amortization payment - 30 years	\$131.9
<u>Current Service Contributions for 1975</u>	
Employee	\$ 23.2
Company	24.3
- \$	24.3
- % of covered payroll	4.75%
<u>Total Company Contributions for 1975</u>	
- \$	\$156.2
- % of covered payroll	30.49%

NOTES

a) See notes at bottom of Table XXII for descriptions of COLA and of the "current", "original" and "2%" formulas.

- b) The amortization calculation is based on the interest rates described earlier.
- c) The Company's current service contribution rate for Run #8, for the provision of "delayed indexing", is lower than that for Run #3, the corresponding Run without COLA. The "total" contribution rate, as expected, is higher for Run #8. The apparent anomaly in the current service contribution rate is caused by a change in the assumed rates of retirement for the provision of indexed benefits, and by the high turnover rates assumed in the cost estimates.

Explanation of Funded Ratio

The term "funded ratio" has been used to represent the ratio of the value of the assets on hand (\$620,000,000) to the accrued liabilities on each of the Runs. The funded ratio is a very rough indicator of the degree of security of benefits enjoyed by plan members. If the plan were actually to be wound up, all benefits under the plan would be frozen (based on salaries and cost-of-living increases only up to the date of termination) and would presumably become fully vested. In that event, the funded ratio would likely be based on market values of assets, and liabilities would be determined using a "single premium" valuation method and assuming no future salary increases and no employee turnover. The resulting funded ratios would likely be considerably higher than those presented in the above calculations.

Cost Estimates for Changes in Survivor Benefits

The Canadian Pacific Limited Pension Plan now provides for survivor benefits to eligible widows and dependent widowers in the event of the death of a pensioner or an employee. My actuaries examined the cost of providing, for deaths which occur on or after January 1, 1975, benefits to surviving *spouses* rather than only to widows and dependent widowers. This examination indicates that the effect on the overall costs of the Plan would be negligible. All of the cost estimates presented in this report allow for benefits to be payable to eligible surviving *spouses*.

In addition to changes in the benefit formulas and changes relating to the Consumer Price Index, they provided estimates of the cost of increasing the level of benefits for survivors of pensioners from the present level of 50% of the regular pension to 60%, 75% and 95% of the regular pension.

They have also examined the cost of removing the "re-marriage clause" with respect to survivor benefits.

These estimates have contemplated *no change* to the amount of the death benefits payable under the Pension Plan in respect of death *prior* to actual retirement.

The results are presented below for certain "benchmark" Runs. The ones chosen for this purpose are Runs #1, #3, #4, #7 and #8.

Results for 60% Survivor Pensions

The results for 60% pensions to surviving spouses of pensioners are as follows:

TABLE XXVII

*60% SURVIVOR PENSIONS
ANALYSIS OF RESULTS AS AT JANUARY 1, 1975
(in millions of dollars)*

	Run #1	Run #3	Run #4	Run #7	Run #8
<u>Balance Sheet</u>					
Assets	\$ 620	\$ 620	\$ 620	\$ 620	\$ 620
Accrued Liabilities	1,426	1,560	1,600	2,813	2,189
Unfunded Liabilities	806	940	980	2,193	1,569
Funded Ratio	43%	40%	39%	22%	28%
Annual Amortization					
Payment - 30 years	\$ 71.8	\$ 83.7	\$ 87.3	\$195.3	\$139.7
<u>Current Service</u>					
<u>Contributions for 1975</u>					
Employee	\$ 23.2	\$ 23.2	\$ 23.2	\$ 23.2	\$ 23.2
Company					
- \$	26.5	26.5	26.5	34.6	24.9
- % of covered payroll	5.17%	5.17%	5.17%	6.75%	4.86%
<u>Total Company</u>					
<u>Contributions for 1975</u>					
- \$	\$ 98.3	\$110.2	\$113.8	\$229.9	\$164.6
- % of covered payroll	19.19%	21.51%	22.22%	44.88%	32.13%

NOTE: See notes at bottom of previous Tables for descriptions of terms.

Results for 75% Survivor Pensions

The results for 75% pensions to surviving spouses of pensioners are as follows:

TABLE XXVIII

*75% SURVIVOR PENSIONS
ANALYSIS OF RESULTS AS AT JANUARY 1, 1975
(in millions of dollars)*

	<u>Run #1</u>	<u>Run #3</u>	<u>Run #4</u>	<u>Run #7</u>	<u>Run #8</u>
<u>Balance Sheet</u>					
Assets	\$ 620	\$ 620	\$ 620	\$ 620	\$ 620
Accrued Liabilities	1,490	1,634	1,680	2,989	2,321
Unfunded Liabilities	870	1,014	1,060	2,369	1,701
Funded Ratio	42%	38%	37%	21%	27%
Annual Amortization					
Payment – 0 years	\$ 77.5	\$ 90.3	\$ 94.4	\$211.0	\$151.5
<u>Current Service Contributions for 1975</u>					
Employee	\$ 23.2	\$ 23.2	\$ 23.2	\$ 23.2	\$ 23.2
Company					
- \$	27.2	27.2	27.2	35.8	25.7
- % of covered payroll	5.31%	5.31%	5.31%	6.99%	5.02%
<u>Total Company Contributions for 1975</u>					
- \$	\$104.7	\$117.5	\$121.6	\$246.8	\$177.2
- % of covered payroll	20.44%	22.94%	23.74%	48.18%	34.59%

NOTE: See notes at bottom of previous Tables for descriptions of terms.

Results for 95% Survivor Pensions

The results for 95% pensions to surviving spouses of pensioners are as follows:

TABLE XXIX

*95% SURVIVOR PENSIONS
ANALYSIS OF RESULTS AS AT JANUARY 1, 1975
(in millions of dollars)*

	Run #1	Run #3	Run #4	Run #7	Run #8
<u>Balance Sheet</u>					
Assets	\$ 620	\$ 620	\$ 620	\$ 620	\$ 620
Accrued Liabilities	1,576	1,732	1,786	3,224	2,496
Unfunded Liabilities	956	1,112	1,166	2,604	1,876
Funded Ratio	39%	36%	35%	19%	25%
Annual Amortization					
Payment – 30 years	\$ 85.1	\$ 99.0	\$103.8	\$231.9	\$167.1
<u>Current Service Contributions for 1975</u>					
Employee	\$ 23.2	\$ 23.2	\$ 23.2	\$ 23.2	\$ 23.2
Company					
- \$	28.1	28.1	28.1	37.4	26.8
- % of covered payroll	5.49%	5.49%	5.49%	7.30%	5.23%
<u>Total Company Contributions for 1975</u>					
- \$	\$113.2	\$127.1	\$131.9	\$269.3	\$193.9
- % of covered payroll	22.10%	24.81%	25.75%	52.58%	37.85%

NOTE: See notes at bottom of previous tables for descriptions of terms.

*Results for 50% Survivor Pensions
without the "Re-Marriage Clause"*

The results for 50% lifetime pensions (not ceasing upon re-marriage) to surviving spouses are as follows:

TABLE XXX

*50% SURVIVOR PENSIONS - WITHOUT "RE-MARRIAGE CLAUSE"
ANALYSIS OF RESULTS AS AT JANUARY 1, 1975
(in millions of dollars)*

	Run #1	Run #3	Run #4	Run #7	Run #8
<u>Balance Sheet</u>					
Assets	\$ 620	\$ 620	\$ 620	\$ 620	\$ 620
Accrued Liabilities	1,427	1,556	1,592	2,794	2,179
Unfunded Liabilities	807	936	972	2,174	1,559
Funded Ratio	43%	40%	39%	22%	28%
Annual Amortization					
Payment - 30 years	\$ 71.9	\$ 83.4	\$ 86.6	\$193.6	\$138.8
<u>Current Service</u>					
<u>Contributions for 1975</u>					
Employee	\$ 23.2	\$ 23.2	\$ 23.2	\$ 23.2	\$ 23.2
Company					
- \$	26.8	26.8	26.8	35.3	25.5
- % of covered payroll	5.24%	5.24%	5.24%	6.89%	4.98%
<u>Total Company</u>					
<u>Contributions for 1975</u>					
- \$	\$ 98.7	\$110.2	\$113.4	\$228.9	\$164.3
- % of covered payroll	19.27%	21.51%	22.14%	44.69%	32.08%

NOTES: See notes at bottom of previous tables for descriptions of terms.

Explanation for the Choice of Amortization Schedule

The choice of an appropriate plan to finance the unfunded liabilities under the Canadian Pacific Limited Pension Plan is a matter of great importance. As at January 1, 1975 my actuaries estimate that the funded ratio stands below 50% and the *unfunded* liabilities are approximately \$763 million.

My terms of reference include the requirement to investigate and report with recommendations upon, among other things, the present and possible alternative bases of funding, notwithstanding existing statutory requirements.

As at January 1, 1973, the unfunded liabilities totalled \$497 million and those unfunded liabilities are currently being amortized in accordance with the Pension Benefits Standards Act (PBSA) Regulations by the following schedule of payments, based on interest at the rate of 6½ % per annum:

1. \$17.82 million per annum to September 30, 2027.
2. \$6.83 million per annum to September 30, 1992.
3. \$13.01 million per annum to September 30, 1992.

According to that schedule, the anticipated unfunded liability as at January 1, 1975 would be approximately \$484 million. This is lower than the unfunded liability of \$763 million shown for Run #1 by \$279 million because of three factors:

1. The net financial experience of the Plan during 1973 and 1974 was less favourable than had been assumed at December 31, 1972.
2. The January 1, 1975 valuation by my actuaries incorporated a number of changes in assumptions and in valuation methods which affected the estimate of the unfunded liabilities.
3. The January 1, 1975 liabilities reflect certain improvements in benefits which increased the unfunded liabilities.

Under the PBSA Regulations, the portion of the \$279 million due to the first factor is classified as an "experience deficiency" and must be amortized by equal annual payments over five years, or faster. The portion of the \$279 million due to the second and third factors is classified as an "initial unfunded liability" and must be amortized by equal annual payments to September 30, 1992, or faster.

As can be seen throughout this Part of my report, my actuaries have not estimated the costs of financing the unfunded liabilities using "minimum PBSA-type" schedules. In their view (and I concur with their judgement in the matter), it must be

difficult for the Plan members and their representatives to understand such a financing schedule and the Canadian Pacific Limited Board of Directors must also find it difficult. Of more immediate importance is the fact that the "minimum" funding schedule described above *not* likely, except by sheer accident, to eliminate the gap between the assets and the accrued liabilities of the Plan.

A high proportion of the accrued liabilities is rapidly increasing in reaction to a high level of increases in wages and salaries. However, most of these accrued liabilities are currently being amortized by a fixed series of payments at an interest rate which reflects a much lower level of inflation than is impacting on the liabilities.

As with most financing schedules, the important considerations for a plan of financing unfunded pension liabilities are the interest rate or rates, the amortization period and the term.

If the liabilities are dynamic rather than fixed, the anticipated growth or decline in the liabilities for benefits accrued up to the valuation date must be incorporated in the financing schedule, either directly or, at least, by offsetting adjustments to the amortization interest rate. The unfunded liability is a debt owed to the fund and conservative financing requires the use of an amortization interest rate that errs on the high side, not the low side.

The choice of amortization period is a difficult, and subjective, one. The possible choices range from immediate payment of all unfunded liabilities to financing in perpetuity (paying interest and unanticipated increases only, to keep the unfunded liabilities from escalating, but not paying them off).

Immediate payment of all unfunded liabilities would require a single outlay of such magnitude than pension plans would seldom be able to make significant benefit improvements for pensioners or older workers in recognition of service prior to the date the improvements are adopted. On the other hand, financing in perpetuity seems somewhat undisciplined and imprudent considering the nature of the obligations and the many uncertainties involved, and would not reduce the annual amortization payment significantly below the level required for a 50-year amortization period.

In the view of my actuaries, considering the stature of Canadian Pacific Limited and the magnitude of the unfunded liabilities, an amortization period of 30 to 50 years would be appropriate. However, in view of the declining workforce and the uncertain prospects for the railroad in the 21st century, we are inclined to favour the lower end of this range and recommend an *amortization period of 30 years*. I concur with their recommendation.

It should again be stressed that the *term* of the amortization schedule should *and* be allowed to *exceed three years*. In other words, the interest rate applicable to the

amortization payments should be re-assessed frequently, particularly if inflation continues at its current high levels, or increases further.

In arriving at the recommended 30-year amortization schedules, they analyzed a number of alternative amortization period for some of the various runs. The analysis is shown in Table XXXI.

TABLE XXXI

*ALTERNATIVE AMORTIZATION PAYMENTS
WITH RESPECT TO THE UNFUNDED LIABILITIES
(in millions of dollars and percentage of covered payroll)*

	Run #1	Run #3	Run #4	Run #7	Run #8
Level payments – 20 years					
– \$	\$ 79.5	\$ 92.8	\$ 96.6	\$216.2	\$154.3
– % in 1975	15.52%	18.12%	18.86%	42.21%	30.12%
– % in 1994					
(a) Static workforce	4.12%	4.81%	5.01%	11.21%	8.00%
(b) Declining workforce	6.17%	7.21%	7.50%	16.79%	11.98%
Level payments – 30 years					
– \$	\$ 67.9	\$ 79.3	\$ 82.6	\$184.8	\$131.9
– % in 1975	13.25%	15.48%	16.12%	36.08%	25.74%
– % in 1994					
(a) static workforce	3.52%	4.11%	4.28%	9.58%	6.84%
(b) declining workforce	5.27%	6.16%	6.41%	14.35%	10.24%
Level payments – 40 years					
– \$	\$ 63.1	\$ 73.6	\$ 76.6	\$171.5	\$122.4
– % in 1975	12.32%	14.37%	14.95%	33.48%	23.90%
– % in 1994					
(a) static workforce	3.27%	3.82%	3.97%	8.89%	6.35%
(b) declining workforce	4.90%	5.72%	5.95%	13.32%	9.50%
Level payments – 50 years					
– \$	\$ 60.7	\$ 70.9	\$ 73.8	\$165.2	\$117.9
– % in 1974	11.85%	13.84%	14.41%	32.25%	23.02%
– % in 1994					
(a) static workforce	3.15%	3.68%	3.83%	8.56%	6.11%
(b) declining workforce	4.71%	5.51%	5.73%	12.83%	9.16%

NOTE: The amortization payments are based on the interest rates noted earlier. Average wages and salaries have been assumed to increase at rates noted earlier.

The level annual amortization payments with respect to the unfunded liabilities represent a reducing percentage of covered payroll in future years. For the year 1994, we have shown the percentage of covered payroll on two bases: a) a static workforce (and increasing payroll) projection; and (b) a declining workforce (but still an increasing payroll) projection. In case (b), the workforce has been assumed to decline by 2% per annum, compounded, from 1975 to 2000, inclusive, remaining constant in size thereafter.

Benefits from a Levy of 1% of Payrolls

In addition to estimating the costs of possible benefit improvements shown above, I asked my actuaries to provide estimates of certain improvements for current pensioners and possibly also to current active members which could be supported by a levy of 1% of existing payrolls, shared equally by current employees and the Company. Pages 44 and 45 describe the details of these possible benefits and their funding. The results follow.

Results of Calculations

They presented two estimates of these benefit improvements – one based on a static workforce, the other on a declining workforce. For the *declining workforce calculations*, the workforce has been assumed to decline by 2% per annum, compounded, from 1975 to 2000, inclusive, remaining constant in size thereafter.

These estimates relate to cost-of-living adjustments *only*. They do not consider any change in the *benefit formula* for pensioners and survivors.

1. *Static workforce results.* On the basis of the static workforce projections, it would be possible to provide either:

- the full "past COLA adjustments" for *current pensioners, deferred pensioners and surviving spouses* plus 24% of the full "future COLA adjustments" for *current pensioners and beneficiaries and active Plan members*, or

- the full cost-of-living increases in excess of the first 30% drop in purchasing power ("delayed COLA") for *current pensioners and beneficiaries and current active Plan members*.

2. *Declining workforce results.* On the basis of the declining workforce projections, it would be possible to provide either:

- the full "past COLA adjustments" for *current pensioners, deferred pensioners and surviving spouses* plus 9% of the full "future COLA adjustments" for *current pensioners and beneficiaries and current active Plan members*, or

- the full cost-of-living adjustments in excess of the first 45% drop in purchasing power ("delayed COLA") for *current pensioners and beneficiaries and current active Plan members*.

In order to maintain these improved benefit provisions for future new entrants to the Plan, the *current service contribution rate for new entrants* would change over the next 30 to 40 years, by varying amounts, depending on which of the options is adopted. For the options shown here, the increase in the current service contribution rate for *new entrants* required to maintain the improved benefits would be relatively small.

The idea of benefit improvements, particularly for current pensioners and survivors, based on this kind of levy is an interesting concept and as indicated earlier, I shall be developing it further at a later stage in my report.

Sensitivity Tests

Tests similar to those described on pages IV-48 and IV-49 were carried out to indicate the changes in the results for the C.P.R. plan that might be anticipated from different actuarial assumptions and methods. The results of these sensitivity tests are presented in Appendix 7.

Extract from Appendix 7

In our view (Paterson, Cook Limited), it would be quite reasonable and appropriate for the Company to follow a funding pattern based on actuarial assumptions different from those on which our main body of valuation results and cost estimates have been prepared. There may be differences of professional opinion as to appropriate assumptions and methods, and the Company may well choose to adopt a greater degree of conservatism than that which we have used for the presentation of results to the Commission of Inquiry.

Based on the sensitivity results in the Part of the report, it would seem to us that there is a fairly wide range of reasonable estimates which could be followed for funding purposes. For example, for Run #1, Run #3 and Run #7, the following might be considered a reasonable range of results for funding purposes.

The "reasonable ranges" presented in the Table below are not scientifically determined by a formula but rather represent our professional opinion based on the main body of valuation results and cost estimates, and on the results of the sensitivity tests.

Run #1 Run #3 Run #7
 (In millions of dollars)

Balance Sheet

Assets	\$620	\$620	\$620
Accrued Liabilities	\$1,300 – \$1,600	\$1,400 – \$1,700	\$2,500 – \$3,200
Unfunded Liabilities	680 – 980	780 – 11080	1,880 – 2,580
Funded Ratio	48% – 39%	44% – 36%	25% – 19%
Annual Amortization Payment – 30 years	\$59 – \$85	\$68 – \$94	\$163 – \$224

Current Service Con-
tributions for 1975

Employee Company	\$23.2	\$23.2	\$23.2
– \$	\$25 – \$36	\$25 – \$36	\$33 – \$46
– % of covered payroll	4.9% – 7.0%	4.9% – 7.0%	6.4% – 9.0%

Total Company Con-
tributions for 1975

– \$	\$84 – \$121	\$93 – \$130	\$196 – \$270
– % of covered payroll	16.4% – 23.6%	– 8.2% – 25.4%	38.3% – 52.7%

Part V

PENSION ADEQUACY, GOVERNMENT AND PRIVATE PLANS, INDEXING, AND THE CONCEPT OF A HERITAGE FUND

In this Part, I propose to make a number of observations on what constitutes adequacy in examining pension plan benefits, the role of government and private pension plans, costs and related matters associated with indexing pension benefits, and to develop the idea of financing benefit improvements through a levy shared equally by employees and the Companies in the form of a "Heritage Fund". A number of these topics have been touched on previously, but they deserve more complete consideration.

Government and Private Pension Plans

Historically the aged were looked after by their families and local communities. With increasing industrialization employer pension plans were introduced. In recent years the government has played an increasingly important role in providing retirement income. The two basic federal programs are the Old Age Security System (OAS) and the Canada (Quebec) Pension Plans. In addition the federally operated Guaranteed Income Supplement (GIS) provides additional income to those who qualify on a means-test basis. There are also various provincial programs aimed at raising the minimum level of income for the over age 65 population (for example, Mincome in B.C. and the Ontario Guaranteed Annual Income System (GAINS).

The result is that the sources of retirement income are many and varied and the entire system has a patchwork appearance. The O.A.S. and CPP are designed to provide a basic floor of retirement income. Additional benefits are to be provided through private pension plans and individual savings. However, only 40% of the paid labour force belong to private pension plans (according to the latest available statistics). The federal GIS program and the provincial supplement programs are designed to alleviate poverty. In 1972, 54.3 percent of the population over age 65¹ who were receiving OAS benefits were also receiving full or partial benefits from the GIS program.

The role of private pension plans and government pension plans cannot be decided in the abstract. It depends on economic, social, cultural and political factors. Furthermore, it is necessary to take account of existing institutions and practices. There does not seem to be any generally accepted definition of what represents an adequate pension. Neither does there seem to be agreement on the proportion of retirement income that should be provided by the private pension plan and the proportion to be provided by the state. However, a desirable principle would seem to be that the combined pension should enable the retired worker to maintain his living standard.

¹ Source: *Canada Year Book*, 1973 (Ottawa, Statistics, Canada), Table 6.6, p. 276.

This principle seems to be winning international acceptance as Schulz² remarks:

"The trend seems to be toward developing public and private pension systems which will permit the retired population to at least maintain a level of living which approximates that which they enjoyed during their working years."

This would seem to represent a desirable principle for the railway pension plans. For a newly retired worker, with substantial service, the *initial* level of retirement income appears adequate on this basis. However the retired members' most common criticism of the railway pension plans was that the real values of the company pensions were being eroded by inflation. Whereas Canadian National has provided some cost of living increases to pensions in course of payment, Canadian Pacific Limited has not. The issue of providing indexed pensions is a complex one and a more detailed discussion is given in a subsequent section.

Returning to the role of government and private plans it would seem reasonable for a target pension to be provided from the combination. Given that the employer has no control over the benefits provided by the government plan, the company plan is left with providing the difference between the target pension and the government pension. Apart from the important question of inflation protection, this is essentially what happens under the railway plans.

The Commission recognizes that private plans and government plans operate on different principles. In particular private plans are funded whereas government plans tend to operate more on a pay-as-you go basis. The Commission notes that the objectives of a private plan and a government plan are different and that there may be problems in coordinating³ them. It is suggested however that the *prime* consideration should be the provision and *maintenance* of benefit adequacy, subject to the constraints outlined in the next section and that the other issues involved in coordinating two widely differing pension systems are of lesser importance.

Although a broad discussion of the merits and demerits of the private pension system is outside the scope of the Terms of Reference, it will be apparent that many features of the railway plans are reflected in a number of other pension plans. To this extent then certain Parts of my report cannot avoid being a commentary on the private pension system in general. The Commission is aware that many Canadians do not have any pension arrangements other than those provided by the government.

² Schulz, James H., "The Economic Impact of an Aging Population", *Journal of Gerontology*, Spring 1973.

³ Since the focus is on the total benefit, this causes difficulties in the collective bargaining process where the emphasis is on the benefits and costs of the company pension plan.

Inflation and Maintenance of Real Retirement Income

In this section the impact of inflation on retired employees, active employees, the companies and the funding arrangements is discussed. Some of the issues involved in maintaining the real value of pensions are examined.

Inflation occurs when the money cost of a fixed basket of goods and services rises. Consequently, if a pension is of a fixed dollar amount the real income of a pensioner will decline during periods of inflation. Even if the pension is increased from time to time, the real income will decline unless the increases are adequate to compensate for the decline in purchasing power.

As has been mentioned earlier, inflation represents the most serious problem facing railway pensioners. For a number of reasons, the problems caused by inflation are likely to be more acute for the older retirees. These reasons include:

- (i) The older retiree usually had a smaller pension to start with since pensions are typically based on pre-retirement salary and salaries have increased through the years.
- (ii) The percentage accrual rate has improved through time; usually these improvements applied only to active workers.
- (iii) The Canada Pension Plan retirement benefit, which changes with changes in the Consumer Price Index is only payable to employees with service after 1966.
- (iv) The longer since an individual retired, the larger the decline in purchasing power.

In the case of survivors' pensions there are two additional factors which make the problem of inflation even more acute. First, the survivor's pension in many cases represents 50% of the original pension. Second, the vast majority of survivors are women. Since women marry men older than themselves and in addition, can expect to live longer than men of the same age, women can expect to spend a much longer period in retirement than men.

The earnings of active members are protected against the effects of inflation since typically the rate of increase in salaries has outpaced the rate of inflation. It is likely that those two quantities will also be highly correlated in the future since the active workers have considerable bargaining power. In both plans pension benefits are based on an individual's average earnings over his last 5 years. Hence the initial benefit at retirement is protected against the inflation which has taken place *during his working life*.

In both of the major railway companies, the pension benefits are provided through segregated trust funds to which the employer and employees both contribute. It is

clear from some of the briefs submitted to the Commission that this funding process is not well understood. This is not surprising since the issue is quite complex. At a later stage the question of the unfunded liability and the question of communication of information on pension matters will be discussed.

Under the present arrangements an individual's retirement benefit consists of a pension which is the product of 2% and his years of pensionable service. From this amount is deducted an amount in respect of his Canada Pension Plan benefit. The contributions in respect of the individual and those paid by the employer are invested in the assets of the trust fund. Since these assets are held in respect of employees not yet retired, it does not follow that the existence of a large fund implies that pension increases can be given at no cost to the company. Another point which would appear to have been misunderstood in some submissions is the question of company contributions to the plan. Again this is a complex issue particularly in cases where there has been a change in the type of plan. However the plans as they stand at present promise a certain level of benefits. The company cost is simply the difference between the total cost of these benefits and that provided by the employee's contributions, *regardless* of the level of unfunded liability at any moment in time.

The C.R.L.A. take the position that the level of benefits has to be a real level of benefit:⁴

"We insist that any approach to the pension problem which does not begin with an acceptable definition of initial and continued *benefit adequacy* and an *employer commitment to meet that goal* is doomed to failure."

The Canadian Pacific Limited Brief dated December 13, 1974 takes a different view:

"The plight of pensioners living on fixed incomes during a period of high inflation is no doubt serious. The burden of alleviating this problem must surely be borne by government and attacked through the instruments of government economic, fiscal and monetary policies as well as through the existing mechanisms of the Canada/Quebec pension plans and Old Age Security."

The Brief of Canadian National echoes similar sentiments to those of Canadian Pacific Limited:

"2. It is significant that very few employers, if any, outside of the public service has indexed pension benefits to the cost of living. Like CN, many employers have granted ad hoc pension increases but virtually none have indexed. They have not done so because the cost is staggering."

⁴ Further Submission by Canadian Railway Labour Association to Commission of Inquiry into the Railway Pension Plans.

And also:

"27. As we have seen it is government alone that can offset the erosion of inflation on pensions, whether in the role of government or employer."

In this connection the following quotation from the book of Laurence E. Coward is of interest:⁵

"Whatever the official text of the pension plan may say, the long term purpose of the pension fund is not to provide so many paper dollars many years hence but to provide a slice of the country's productive capacity; so much food, clothing and shelter when the employees are too old or too disabled to produce goods and services themselves. The real problem is how to accumulate the purchasing power of the contributions made at any time by the employer and employee as purchasing power to be utilized many years hence."

The Commission recognizes this as a desirable objective while at the same time noting that it can be extremely costly for an individual company to provide pension benefits indexed to the cost of living. This is particularly the case since private plans do not have access to investments whose interest and principal payments also increase with the cost of living. Since the railway labour force is declining, there are obvious dangers in providing cost-of-living increases for retired members on a pay-as-you-go basis. Because the investment returns cannot be guaranteed to outmatch inflation, it would appear that if pensioners are to be protected against inflation the additional contributions should come from government or else from the employer and employees.

The Commission is reluctant to recommend that the government take special steps to protect the retired members of the railway labour force *without* steps being taken to afford similar protection for other groups of retired people. The government's efforts are perhaps best directed at the entire over age 65 group through the Canada Pension Plan, the Old Age Security System, the Guaranteed Income Supplement, the various provincial programs and measures offering tax relief to the aged. The Commission takes the view that it would be discriminatory for the government to increase the pensions of retired railway workers without granting similar increases to the pensioners of other private plans. This conclusion is reached, notwithstanding the fact that the railways are and have been used as instruments of national policy.

In view of these considerations, it is suggested that the cost of providing pension increases should be shared by the employer and the employee. Full cost of living indexing may prove to be too expensive as the companies have suggested. However, there are many ways by which the cost could be reduced, while at the same time giving the retired employees *some measure* of protection. In view of the comments at the beginning of this section it would appear that the older pensioners form a group with special

⁵ *Mercer Handbook of Canadian Pension and Welfare Plans* by Laurence E. Coward, Fifth Edition 1974, published CCH - Canadian Limited.

priority needs. This is particularly the case with regard to Canadian Pacific Limited pensioners. Later on, specific proposals to help the older pensioners will be put forward.

Some of the ways by which the cost of providing the cost-of-living increases could be limited are as follows:

- (i) Limit the cost-of-living increases to a stipulated percentage, e.g. 4%.
- (ii) In view of the fact that the initial level of pension is quite adequate for a long-service employee, delay the increasing of pension benefits until the employee has been on pension for a certain period, say 5 years.
- (iii) Give pensioners at retirement a choice of:
 - (a) a normal pension benefit without the indexing adjustment
 - (b) reduced initial pension of the same actuarial value which increases each year.
- (iv) Increase the pensions in course of payment at regular intervals to take account of the decline in purchasing power since the last increase.

In practice, a combination of these methods could be used. The list is not intended to be exhaustive. However, to ensure the continued protection of pensioners' interests, it is necessary that their interests be effectively represented. The key decisions with regard to benefit improvements are now made through the collective bargaining process and currently pensioners have no direct voice in these negotiations. As long as pensions are collectively bargained, it is submitted that there should be an effective method of dealing with the problems of the retired group through this process. This report will include a number of positive suggestions on how this can be achieved while at the same time maintaining a proper and equitable balance of power between the active and retired members of the plan. The Commission believes that the establishment of a mechanism to deal with the interests of the pensioners through the collective bargaining process should contribute significantly to the solution of the main problems facing the railway pension plans.

What Constitutes Adequacy on a Relative and on an Absolute Basis?

In a much quoted statement, the Honorable Marc Lalond has indicated that the government plans achieve adequacy.⁶

"The Canada Pension Plan was not set up to provide a total retirement income. Rather it was viewed as the middle tier of a three tier system – Old Age

⁶ Canadian Pension Conference, November 26, 1973.

Security, the Canada Pension Plan, and private pensions and annuities. The first two components were geared to ensure adequacy, the third to provide whatever supplementary margin of comfort was desired."

It is interesting to examine the level of pensions being paid by the Canada Pension Plan in the context of these remarks. Table I gives the average monthly retirement pension as at December 31, 1974. Admittedly these pensions have arisen while the plan was in the transition period and to this extent are not indicative of the level of pensions that will be payable from 1976 onwards.

TABLE I

Retirement Pensions Payable From The Canadian Pension Plan

Age	Number	(Male and Female)	
		Gross Amount	Monthly Average
65	28,124	1,869,637	\$264.17
66	38,357	2,322,455	60.99
67	38,254	2,274,126	55.60
68	36,672	1,898,837	49.73
69	34,783	1,621,950	45.10
70	36,715	1,710,730	44.34
71-74	109,455	4,059,972	34.18
75 or over	36,582	672,561	18.27

Taken in conjunction with monthly Old Age Security payments of approximately \$120, the first two tiers are probably not "adequate" at the present time.

Schulz⁷ writes:

"There is no generally accepted definition of what is an adequate pension. This is a very subjective question which many have argued should be decided by the individual. Increasingly, however, discussion of this question has centred around what proportion of pre-retirement income is needed and desired to prevent a sharp drop in living standards."

Thomas Bleakney⁸ in his book on Retirement Systems for Public Employees approaches the problem as follows:

⁷ Schulz, James H., *Journal of Gerontology*, Spring 1973

⁸ Bleakney, Thomas P., *Retirement Systems for Public Employees*, Richard D. Irwin, Inc., 1972

"The objective of any retirement program should be to provide benefits which, along with a retiree's other retirement income, will be adequate for his post-retirement needs. The key word

is "adequate". There is no consensus as to the level which bring about adequacy. Beneficiaries and potential beneficiaries seldom accept existing levels as "adequate" so there is a constant striving to increase the level of benefit. For the employer, a prime consideration is the fiscal requirement the plan will entail. Perhaps the only objective quide available is our analysis of what is being done by other plans of a comparative nature."

It is clear that if Bleakney's perception of "adequate" as given in the first sentence of the quotation is similar to that of the Honorable Minister there would be no need for private pension systems at all.

The concept of adequacy cannot stand by itself; it needs an object to complete its meaning. Thus a pension is deemed adequate if it meets certain standards. For example it may be adequate to:

(a) Allow the pensioner to subsist by providing no more than the bare necessities of life (food and shelter). This is adequacy in absolute terms, even though the cost of food and shelter has been constantly rising. The subsistence level, expressed in dollars can be approximated by making a survey of food prices and rents for each locality in question.

(b) Keep the pensioner above the poverty line. However "poverty"^{*} is a relative concept which owes its meaning to more or less arbitrary, periodic definition and redefinition.⁹ As Demos¹⁰ says "...as soon as the majority have reached the level which the few have enjoyed, then the standard (of living) is lifted to a higher floor. No sooner do we cease being poor than we become poor once more, because the scale of living has been upped." This is adequacy in relative terms.

(c) Permit the pensioner to live in the style to which he has been accustomed. This test of adequacy compares the standard of living before and after retirement.

(d) Permit the pensioner to live on the same plane as other pensioners.

The Railway Companies tend to agree that definition (c) is the most appropriate one to use in connection with the railway plans. It is assumed that this relates to a retired employee who has completed 35 years pensionable service and is retiring at the present time. (cf. Canadian Pacific Limited Response to the Canadian Railway Labour Association Submission to page 10, paragraph 1. Canadian National Railways Submission No. 1 to the Commission of Inquiry into Railway Pension Plans, page 34.) The

* See Appendix for statistics relating to the poverty line in Canada

9 Wilson, Thomas (ed.), *Pension Inflation and Growth*, London: Heinemen, 1974.

10 Demos, Raphael, "Business and the Good Society", *Harvard Business Review* July-August, 1955

Canadian Railway Labour Association uses (c) as the basis of their definition of adequacy but introduces the important proviso that adequacy should be maintained. Thus on page 42 of the initial C.R.L.A. submission it is stated that:

"The basic concern of the Association is that the railway pension plans should provide benefits which are adequate at the time of retirement and which maintain adequacy thereafter, even under conditions of inflation. We believe that the appropriate standard of adequacy is the employee's relative standard of living at the time he retires."

In addition, the C.R.L.A. points out that the comparisons made by the Companies to demonstrate the adequacy of the plan do not take into account "the plight of present railway pensioners". The three major parties agree that under the present rules the initial level of benefit is adequate. The C.R.L.A. claims that adequacy is not maintained and that the pensions paid to existing pensioners are inadequate.

The Commission feels that the *initial* level of pension for *long service* railway employees who have *recently retired* and for those who *will retire* in the future are indeed adequate on any reasonable definition of adequacy - assuming that benefits payable from Government plans are also taken into account. However, it is clear the pensions being paid to many of the current retired employees are inadequate. In particular, the pensions being paid to the older pensioners are inadequate in the light of the inflation that has taken place since they retired. Some of the Commission's recommendations will be aimed at improving the level of these pension benefits.

Pensions Under Collective Bargaining

Since their inception in the 1930's the pension plans of the two major railways have changed considerably. There has been a gradual improvement in benefits together with increased employee contributions. In 1973, pensions became, for the first time, a negotiable item under the collective bargaining process. Considerable concern has been expressed by the retired employees that their interests are not being effectively represented under the present system. It is the purpose of this section to examine the railway pension plans in the collective bargaining environment and to consider the question of pensioner representation.

In some ways pensions are quite different from the usual range of items that are subject to collective bargaining. This is especially the case when the retirement benefit is based on an employee's final average salary as is the case with the major railway plans. In these circumstances, a benefit improvement granted to active members may not become payable until far into the future. The precise cost of such an improvement cannot be known with certainty in advance. At best, various estimates can be given and the Unions and the Companies may from time to time disagree as to the best estimate. Essentially, it was this type of problem that gave rise to the Deutsch Commission of Inquiry. However, both the major railway companies and the C.R.L.A. are in

favour of maintaining the present system. The Commission endorses this viewpoint. It would appear anomalous for the most important and valuable item in the fringe benefit package not to be a negotiable item.

A further important distinction between pension benefits and the other bargaining items is that the current beneficiaries of the pension plan consist of retired employees. Since these retired employees are no longer members of the bargaining unit, they depend to a large extent on the "good grace" of those workers. It is however open to the companies to improve the pensions of those already retired. Canadian National has in fact recently granted increases to retired pensioners.

It can be argued that the active workers have a strong *moral obligation* to bargain just as forcefully for improvements to current pensions (especially in periods of high inflation) as they do for improvements to the benefits for the active lives. However, the realities of the situation are such that the perspective of the younger, active employees, towards the pension plan is quite different from those of the workers close to retirement. It is asking a lot of human nature to expect the active employees to be just as concerned about the level of benefits paid to the retired as they are about their own standard of living. Yet, if the active members do not represent the interests of the retired at the bargaining table, who will?

It could be argued that the C.R.L.A. has attempted to represent the interests of those retired. Many of the submissions received from individual pensioners and pensioner associations reject this view. Certainly, improvement of pensions to retired lives is stated as one of the C.R.L.A.'s immediate priorities. However, this objective can be pursued with varying degrees of intensity. An examination of the items successfully bargained for in the last two years indicates that the benefit improvements in respect of active members have been pursued with more vigor. The companies have contended that the Unions have no power to bargain for benefits to retired employees, who are outside the bargaining unit.

Furthermore, the active membership of the pension plan includes a substantial number of employees who do not belong to the Unions. Benefit improvements obtained at the bargaining table also apply to such employees.

As has been indicated earlier, the Companies have suggested that the government should take steps to protect the pensions of those already retired against inflation. The Commission does not totally share this view and *recommends* that the solution to the problem must come from the combined efforts of the active workers and the railway companies. There should be a mechanism whereby the interests of the retired employees could be more effectively represented at the collective bargaining table.

The representation or lack of it afforded to current pensioners in the case of the railway pension plans is quite normal for Canadian pension plans. The vast majority of

pension plans surveyed by the Commission did not tend to have a higher degree of pensioner representation at the bargaining table than prevails on the two major railways. At this stage, we are *not* discussing the administration or trusteeship of the plan, which is dealt with as a separate issue.

However, one pension plan which did afford a much higher degree of pensioner representation was that of the United Auto Workers. Essentially, this is achieved by the formation of Retired Worker Chapters. Liaison with the local union is maintained by permitting the retired members to elect one of their number to represent them on the Local Union Executive Board with voice and vote. Furthermore, the Local Union President or his designee serves as a member of the governing board of the Local Union Retired Worker Chapter with voice and vote. In this way, the Local Union is kept informed of the problems confronting the retired. Pensions to retired members have thus been increased on a number of occasions through the collective bargaining process.

This type of structure would seem to provide the railway pensioners with sufficient power to permit them an effective voice in the bargaining process, while at the same time including desirable checks and balances. There are in existence a number of railway pensioner organizations. These tend to organize along company lines and some of them contain both active and retired members. It would not be appropriate for the Commission to recommend that any one of these associations should be the most suitable vehicle to represent the retired members' interest. However, these organizations could provide constructive help in setting up a new organization patterned along the lines of the U.A.W. Retired Worker Chapters.

To set up the organization would require the support and cooperation of the C.R.L.A. and also the railway companies. It would be preferable if the necessary changes could be implemented on a *voluntary* basis, without having recourse to statute. The *precise* form of a new arrangement could be worked out by the C.R.L.A. and the existing pensioner associations, under the auspices of the Minister of Labour.

The Commission recognizes that the creation of such an organization with the powers just described may involve some reduction in the autonomy of the C.R.L.A. However, if this recommendation were implemented, the attitude and responsibility of the C.R.L.A. would serve as a model for other labour unions and contribute substantially to the solution of some of the major problems facing the railway pension plans.

Indexing of Pension Benefits

The rapid escalation of wage, salaries, and prices in recent years have had a serious eroding effect on the purchasing power of retired employees. To the extent that these pressures continue unabated in future years, pension benefits of those about to retire or retiring in the future will be similarly eroded. As a result, increasing attention is being directed to the possibility of "indexing" pension benefits to the cost-of-living.

To some extent, the indexing of government pension plans (OASP and CPP/QPP) will alleviate the pressure to index private plans, but given the disparity in the relative contributions of OASP and CCP/QPP compared with private plans to the individual's *total* retirement income, the degree of alleviation is not likely to be very significant. For large employers like the C.P.R., and more particularly the C.N.R. (which many see as an agency of government) the fact that public service and crown corporations pensions are fully-indexed adds more "fuel" to the demand for full-indexing of railway pension plans.

It is my opinion that unless we find the means to provide some adjustment for the erosion in purchasing power of pensioners that has already taken place and similarly, if we are not able to prevent further erosion, the integrity of private plans in Canada will be seriously threatened. The consequences of such a loss of confidence are difficult to measure, but there is no doubt in my mind that they would be enormous.

Inflation and Pensions

I would now like to examine more specifically the impact of inflation on private pension plans, Dr. Phelim Boyle, F.I.A., F.C.I.A. is a colleague of mine in the Faculty of Commerce and Business Administration at the University of British Columbia. He has also provided me with some sound technical advice during the course of my inquiry and for that, I am indebted to him.

Dr. Boyle has prepared a paper on the subject and because of its relevance and thoroughness, I have included it almost in its entirety and have added my emphasis where appropriate. Dr. Boyle writes as follows:

The Impact of Inflation on Pension Plans

1. Introduction

Inflation is probably the most important problem facing pension plans today. In fact, it may also represent the most critical problem facing society. This paper examines the impact of inflation on pension plans. In particular, we look at the impact of inflation on the design and funding of pension plans. We also examine some short-run and long-run measures that might serve to preserve the purchasing power of retired members.

2. Impact on Inflation

Let us examine the impact of inflation on a final average salary plan. Suppose this plan is funded by a level percentage of the salary roll each year. If there is a steep upward increase in salaries due to inflation this transmits a corresponding increase to the plan liabilities. The increased salaries will give rise in increased contributions (in absolute amounts) but these will hardly ever compensate for the

rise in liabilities. *It is tempting to suppose that the additional liabilities could be offset by increased earnings on the assets of the fund.* One of the main problems in the last few years has been caused by the depressingly poor investment performance. *Over the last year, many plans have not even achieved a positive rate of return (on a nominal basis). These additional investment earnings are just not there.* Consequently, some plans may have difficulty meeting their funding obligations under the various Pension Benefits Standards Acts.

With this background, we now turn to examine the plight of existing pensioners. Very few plans outside the public sector provide for automatic indexing of pension benefits. In fact, the regulations of the Department of National Revenue have tended to preclude this feature. The Department now permits a plan to provide for *escalation* but does not allow *advance funding* of this benefit. From October 1971 to October 1974, the Consumer Price Index rose by 27.65 percent. *An initial pension of \$500 per month declined in real value to \$392 per month during this three-year period.* Furthermore, as mentioned above, this period has coincided with a decline in market values so that companies are already finding it difficult to fund the benefits of the active members. *Yet if we accept that one of the purposes of a pension plan is to provide the retired lives with a supply of real goods and services then many plans are simply failing to meet this objective at the moment.* It can be argued at this stage that the Government has the ultimate responsibility for controlling inflation and so government should act to cushion its effects on the old and poorly organized. Even if the government does act in this way, the private pension system will be judged defective. Furthermore, a number of people feel that the Government is already too involved in redistributing income among the various sectors of society.

In considering appropriate design and funding arrangements one must take a view as to whether the traditional relationships between certain economic indicators will be maintained in the future. In particular, will the rate of return realized in investments out-perform the rate of inflation (wage inflation) over reasonably long periods and what will the magnitude of this differential be? Assuming the answer to the first question is yes, then the existing final average salary plan can still be viable. Active members are still protected against inflation until they retire. After retirement, they would need cost-of-living increases related to the increase in the C.P.I.

In theory, these increases could be advance funded but, as mentioned earlier, the DNR does not permit this. The same effect can be obtained by adjusting the actuarial basis. However, it is expensive to pre-fund this benefit - an increase of 3% p.a. can increase pension costs by 20%. The other approach is to prefund benefits to age 65. After that, the increments granted to pensioners are funded on a pay-as-you-go basis. This has certain attractions but for a declining workforce this could impose an unbearable economic strain. It has also been pointed out that many plans in Canada are still funding considerable amounts of past service, and

that this generation cannot be expected to fund its own past service, its own current service plus indexed benefits for the previous generation as well.

It is interesting to note that Canadian companies tend to spend lower percentages of salaries on pensions than is the case in the U.K. However, in Canada, the additional dollars go into other fringe benefits for the active members. These fringe benefits probably have a greater appeal for the (younger) active members. At any rate, *it might be possible to improve pension benefits simply by a realignment of priorities*. However, *pensioners do not usually have an effective voice in many of these decisions* and so it is unlikely that this would happen.

We have already alluded to the importance of investment performance. If we discount its use as a comparison measure, the nominal rate of return is really not very meaningful. The real return is the nominal rate deflated by the inflation index. If we take the view that the plan should produce benefits which are expressed in constant dollars, this is what really counts. Part of the confusion may arise because measurement of investment performance is often used to assess the money manager. *It can also be used to see how the plan is performing with respect of its own target return.* Quotation of the real return would seem to be a logical consequence of price level accounting – a topic which is much in vogue at the moment.

Let us go back now to the case where the traditional economic relationships break down. In this case the rate of inflation exceeds or is just equal to the rate of investment return. Funding no longer makes sense in this world. A pay-as-you-go pension system similar to that of repartition, used in France, could be adopted. To be workable, this would need to be run on a nationwide basis.

3. *Specific Measures to Preserve The Purchasing Power of Retired Members*

In this section, we discuss a number of ways which can help to maintain the purchasing power of existing pensioners.

A. Leave it to the Government:

The Government can soften the impact of inflation on retired lives by

- (i) increasing benefits from Government plans
- (ii) increasing the level of benefits under these plans
- (iii) increasing the tax-free allowance of pensioners
- (iv) making some or all of the benefits from Government plans tax-free:

All these measures help but they often serve to highlight the inadequacy of the fixed dollar company pension plan. *If a male retiring at 65 lives for 14 years, the erosion of a fixed dollar pension when inflation runs at 10 percent per annum is frightening.*

TABLE I

*Erosion of a fixed dollar pension over 14 years
with inflation at 10 percent p.a.*

Year	Annual Pension in current dollars \$	Annual Pension in 1975 dollars \$
1 (1975)	6000	6000
2	6000	5455
3	6000	4959
4	6000	4508
5	6000	4098
6	6000	3726
7	6000	3387
8	6000	3079
9	6000	2799
10	6000	2545
11	6000	2313
12	6000	2103
13	6000	1912
14	6000	1738

B. *Improve Pensions on an ad hoc basis*

Many private sector plans have already adopted this procedure. From time to time improvements are made to current pensioners depending on the experience with regard to inflation and the financial strength and disposition of the company. In times of moderate inflation this can be a satisfactory solution. With severe inflation it may not be adequate as far as the pensioners are concerned since the costs are very heavy and so it is difficult to maintain full purchasing power. Nevertheless, the old maxim still applies: half a loaf is better than no bread. The company retains control over the costs which, from its viewpoint, is clearly an advantage.

C. *Set up a formal procedure for increasing current pensions*

The cost of this might be shared between the active employees and the employer with safeguards to limit the cost. Given the existing DNR legislation and a realistic actuarial basis, it is not possible to pre-fund these increases. However, there is some freedom in the choice of actuarial basis and the *DNR regulations might be relaxed*. There are various methods by which one can limit the cost and we will examine three of them.

(i) *Contributions limited to a certain maximum*

The cost of improving pensions in the course of payment is *shared each year between the active members and the employer*. Perhaps the active members might share the cost equally up to a limit of 1/2% of salary per member, thereafter the employer would pay the balance up to a limit, say, of 1% of the total salary roll. These additional contributions would be earmarked for the improvement of pensions in the course of payment.

(ii) *Limitation on increases: absolute limit*

One could impose a limit on the amounts of increase granted and control the cost in this way. For instance, the benefits could be adjusted each year after retirement in line with changes in the CPI subject to the limitation that the benefit in any one year may neither increase nor decrease by more than 3% from one year to the next. As far as the retired life is concerned this causes a number of difficulties during periods of high inflation. Even if inflation abates he is still left behind. (He is of course even worse off if inflation continues at a high rate!)

An example clarifies this point. Suppose, for example, the CPI changes as follows:

Year	Rate of Change in the C.P.I.	Pension Increase
1975	10.00%	3%
1976	10.00%	3%
1977	9.00%	3%
1978	2.00%	2%
1979	0.00%	0%
1980	1.00%	1%

Over this period, the cumulative increase in the CPI is 35.86%. The corresponding increase in the member's pension is 12.56. *In real terms his (or her) pension has declined by 17%*. Unless the rate of change in the consumer

price index falls below minus 3% it is impossible for the pension to have its purchasing power restored under this system. If there is a continued positive rate of inflation he (or she) is always saddled with this decline in purchasing power. Insofar as the rate of inflation exceeds 3% in any year the member simply falls further and further behind. Attention should be paid to the cumulative rate of inflation since retirement.

(iii) The third method that might be considered may represent a departure from the normal method of settling increases which does not tend to give proportionately higher increases to the lower pensioners. Normally, increases are a function of the amount of pension and period elapsed since retirement.

Each year that portion of a member's pension which corresponds to 75% of the Yearly Maximum Pensionable Earnings under the Canada Pension Plan is increased at the full rate of increase in the CPI. The balance of the member's pension is increased at some lesser rate. If the member's pension is less than 75% of the YMPE, it is fully indexed for life. If in any year the rate of increase in the CPI exceeds the rate of increase in the National Average Wage then pensions are increased by the lower figure.

The rationale behind this method is that the YMPE will increase each year in line with the national average salary. It seems equitable that this portion of a member's pension should be indexed if resources are limited. The rationale for the 75% is that the Canada Pension Plan will supply the other 25%.

D. Amend Legislation

The funding requirements of the existing Pension Benefits Acts could be relaxed so that a higher proportion of current contributions could be used to improve the benefits of retired members. This would tend to jeopardise the security of the benefits of active members and it would be difficult to strike a balance. One of the main arguments in favour of funding is that each employee's benefits are paid for while he is working.

Another approach that could be adopted would be for the Department of National Revenue to permit a member to take a certain proportion of his retirement benefit as a lump sum. In some circumstances this might only tend to compound the problems of inflation. For some, particularly the more financially aware, this could, however, be a useful benefit. It could be used to start a business venture, purchase a smaller house, or invested as he sees fit. Another way the lump sum might be used would be for the retired life to purchase a lease to his apartment which would expire on the death of the surviving spouse. I do not know if this feature is available anywhere yet. However,

it is essential that the pension remaining after the computation for any lump sum be adequate. Lump sum payments from tax free funds are available in the U.K. up to a limit of one quarter of the member's pension entitlement.

This lump sum provision leads to the following suggestion which has recently been made in Australia¹.

"One of the provisions of the proposed scheme is that the member should be able to use part or all of the lump sum available to him on retirement to purchase a pension from the Government. We suggest that it should be a Consumer Price Index-linked pension and that such pensions should be made available to private pensioners on the same terms. We think the terms of issue should be favourable and, if need be, limits could be placed on the amount of pension which any individual could buy, as is in fact the case in the proposed scheme."

In Canada this could be accommodated by permitting an individual at 65 to increase his pension under the Canada Pension Plan by paying an additional lump sum.

E. Introduction of Indexed Investments

The suggestion in the last paragraph proposed a particular form of indexed investment available only to pensioners. It would be possible to introduce widespread indexation. Contracts would be expressed in terms of units of constant purchasing power. It has been claimed² that not only would indexation transmit the harmful effects of inflation more quickly and evenly but it would lead to reduction in the level of inflation. However, without going into the pros and cons of indexing, it is clear that indexed investments would be eminently suitable for the assets of pension plans.

Dr. Boyle's analysis can leave little doubt in anyone's mind that the impact of inflation on private pension plans to date has been very great and unless positive steps are taken to control inflation and to alleviate its impact on pensioners, the consequences could be most unpleasant.

I note that under my terms of reference, in examining possible alternative methods and bases of funding, I am empowered to do so, "notwithstanding existing statutory requirements". It is apparent that whereas my Commission is concerned with railway pension plans, my analysis and recommendations may be relevant to private pension plans in general. My specific recommendations must of course be limited

¹ Pollard, A.H. and Melville, G.L. *Report on the Treasurer's Proposals for a new Superannuation Scheme for Australian Government Employees*. Sydney, 5th June, 1974.

² Friedman, Milton, "Using Escalators to Help Fight Inflation" *FORTUNE* (July 1974) pp. 94-97, 174-176.

to railway pension plans, but in view of many of the issues raised by Dr. Boyle (and I concur with most of them) and in view of the seriousness of these issues, I would urge in the strongest possible way that the appropriate agencies of government give the highest priority to finding ways and means to alleviate the impact of inflation on pensioners. With specific reference to Dr. Boyle's analysis and suggestions, I would hope that urgent study could be directed to the following:

1. The possibility of amending Department of National Revenue regulations as they pertain to advance funding of indexed pension plans,
2. The possibility of increasing the tax-free allowances of pensioners,
3. The possibility of making some or all of the benefits from government plans tax-free,

4. Consideration of the idea that the Department of National Revenue might permit an individual to take a certain proportion of his retirement entitlement as a lump sum payment,

5. In conjunction with #4, consideration to permitting an individual at age 65 to increase his pension under the Canada Pension Plan by paying an additional lump sum.

These are of course, complicated questions but on the other hand, the situation in which many retired people find themselves is serious and in my opinion, no effort should be spared in finding equitable and just relief.

Those who, either for convenience or because of their lack of awareness of the facts, speak lightly of the costs associated with the cost-of-living indexing of pension plans, will find little comfort in the estimates presented in Part IV. Regardless of which actuarial assumptions are used, the inescapable conclusion is that the *full* indexing of pension benefits is an enormously expensive undertaking.

Under the C.N.R. plans, the actuarial valuation as at January 1st, 1974, as developed in Part IV, indicates an annual amortization payment of \$98.1 million in addition to current service contributions of \$55.9 million which in total represents 17.09% of covered payroll. Comparable figures for the C.P.R. plan are \$67.9 million for annual amortization payments and an additional \$26.0 million in current service payments, which represents in total 18.33% of covered payroll. With *full* indexing of pension benefits under the C.N.R. plans, annual amortization payments would increase to \$222.0 million, current service contributions would increase to \$86.1 million, which in total represents 34.19% of covered payroll. Comparable figures for the C.P.R. plan are \$153.4 million for annual amortization payments, current service contributions would increase to \$33.8 million, which in total represents 36.55% of covered payroll.

It must be *stressed* that these estimates are for *full* indexing; that is, increasing benefits for present pensioners, deferred pensioners and survivors to adjust for *past* increases in the Consumer Price Index and adjusting *both* present and future pensions in line with assumed future increases in the Comsumer Price Index for pensioners, deferred pensioners, survivors and current active employees. It represents therefore, the most expensive of the various *degrees* of indexing examined in Part IV. Nevertheless, indexing to a degree short of full adjustment for cost-of-living increases carries considerable financial burdens.

I have given this matter a great deal of thought, and taking all of the circumstances into account, I am reluctant to make a recommendation concerning the indexing of railway pension plans at this time. Indexing may come about at some future stage, either on a partial or full basis, but if that is to happen, it will likely require a realignment of priorities at the bargaining table. As indicated earlier, in my judgement, railway pension plans properly belong within the scope of collective bargaining and if a major undertaking such as partial or full indexing is to be accomplished, the initiative for it must rest with the parties to the collective bargaining relationship. The provision of indexing, either partial or full, would require the C.N.R., the C.P.R., and the C.R.L.A. to re-think their economic priorities, particularly concerning the traditional trade-off between immediate benefits (increases in wages, salaries, etc.) and long-term benefits (pensions and other kinds of deferred benefits). In my role as a Commission of Inquiry, it would not be appropriate for me to make a recommendation which would have the effect of relieving the C.N.R., the C.P.R., and C.R.L.A. from a responsibility that properly falls to them. The initiative belongs with them and in Part IV I have set-out the cost dimensions of the problem, should they decide to move in that direction.

Having reached that conclusion, I cannot in conscience ignore the plight of current pensioners, particularly those who have been retired for many years. I therefore propose to direct my attention to the concept of a "Heritage Fund".

The Concept of a Heritage Fund

In Part IV, I explored briefly the idea of providing some relief for current pensioners, deferred pensioners and for those in receipt of survivor benefits by a levy of 1% of payroll, shared equally by current employees and the Companies. I asked my actuaries to determine if such a levy would be sufficient to provide a *full* "past COLA adjustment" and if not, that they examine two alternatives providing for partial adjustment. I also asked them to determine what level of future cost-of-living increases might be provided by any excess funds from such a levy. The detailed results of these estimates are contained in Part IV, for both the C.N.R. and the C.P.R. plans.

I recommend that there be created a "Heritage Fund", based on a levy of 1% of existing payrolls, shared equally by current employees and the Companies. The principal purpose of the "Heritage Fund" is to provide for the *full* "past COLA adjustments" for *current* pensioners, deferred pensioners, and those in receipt of survivor benefits,

exclusive of any ad hoc adjustments currently being received. The "Heritage Fund" should be administered in conjunction with existing pension funds, but should be accounted for separately. Any funds thus generated in excess of those needed to meet the principal purpose of the "Heritage Fund" should be used to help finance future pension plan improvements. In my opinion, the best basis for introducing the fund is on the declining workforce estimates contained in Part IV.

During the course of my Inquiry I have gained some insight into the railway industry, its institutions, its problems, and its people I have concluded that it is a natural situation for the concept of a "Heritage Fund". Its early creation would be a bold move by the C.N.R., the C.P.R., and the C.R.L.A. to alleviate the hardships being experienced by existing pensioners. There has developed in the railway industry a sense of shared experiences and traditions by both past and present employees that has been lost in most other industries. There is a strong feeling of continuity and a resulting comradiere that seems to be transmitted from one generation of employees to succeeding generations. Indeed, the sense of continuity is particularly evident in the smaller railroading communities, where sons (and daughters) follow their father into life-long careers in the industry. In many centres, past and present employees constitute a significant proportion of the total community. For these and other reasons, the industry is a "natural" setting for the development of such a fund.

It may be argued that a "Heritage Fund" as recommended is a bad precedent in that it places a burden on one generation in order to bestow a benefit on a past generation. While there is some merit in this argument, it should be remembered that current and future generations are themselves the beneficiaries of the foundations laid by those who laboured in the past. The "legacy" inherited by present and future generations is a real one, particularly in a unionized setting characterized by collective bargaining. It takes the form of a collective agreement and historically the collective agreement enshrines the sacrifices and struggles of the past, beginning with the very right to organize and including reduced hours of work, better working conditions, seniority rights and protection against arbitrary treatment and layoff, protection against unsafe working conditions, opportunity for improved training, and the multitude of other benefits ensconced in the typical collective agreement. Each succeeding generation makes its contribution, but it *must* be remembered that it does not begin at "square one"; it builds on the rights and benefits acquired by past generations through their sacrifices and as a result of their struggles and accomplishments.

In the broader scheme, the present system of unemployment insurance for example, from which today's generation benefits, goes back to 1941 and was instituted only after a long and hard struggle by employees of that and succeeding eras. Our society is full of similar examples of the benefits, economic and non-economic, that are passed on from one generation to the next. Indeed, the basis for a sound pension plan that today's "active" employees and that *future* employees will benefit from was established by *past* employees and representations of management sitting down together, discussing and

"ordering" their priorities, and over the years, evolving the present package of fringe benefits.

It may be argued that inflation is a universal problem and therefore must be resolved in its impact by government. Whereas I have some sympathy with this argument, I do not believe that it relieves management and labour unions from using their ingenuity to see what they can accomplish through their joint efforts. In the particular case of the railway industry, management showed no lack of imagination or creativity in tackling the massive engineering problems faced in the past in building the Canadian railway system, nor in tackling present-day problems of developing new communications systems, adapting to new market forces, and finding new opportunities in their myriad operations to be capitalized upon. Similarly, the railway unions have not been lacking in imagination in presenting new demands for the Companies to respond to, nor in recognizing the need for and the benefits to be derived from the formation of C.R.L.A. and the resulting system of industry-wide bargaining.

In my opinion, the concept of a "Heritage Fund" represents a challenge to the leadership of the C.N.R., and C.P.R., and the C.R.L.A. to put their minds to the problems facing current pensioners and to succeed at the task of alleviating their plight.

PART VI

CONCLUDING COMMENTS

A great many submissions have been made urging a wide variety of changes in railway pension plans and their administration. They vary in importance and I cannot address myself to all of them individually, but many of them do require consideration and response.

Many suggestions were made that in my judgement should be handled through established collective bargaining procedures. These include provisions for relating railway pension plans to the CPP/QPP (integration vs. stacking), provisions for credit for wartime service, vesting provisions, basing pensions on the best year's earnings, rather than on a five-year average, early retirement without penalty of age fifty-five and thirty year's service, provisions for handling deficiency payments and the re-opening of the 1959 C.N.R. Plan, and 2% for *all* years of service.

A number of problems were raised that are in my judgement beyond my terms of reference. Among these are the pension conditions under which employees of the Newfoundland Government Railway were transferred to the C.N.R. when Newfoundland joined Confederation. This appears to be a grievance against the Government of Newfoundland.

A very serious and complex problem was raised concerning the conditions under which the Intercolonial and Prince Edward Island Railways were transferred to the C.N.R. It also involves the I.P.E.I. Employees' Provident Fund which contains provisions concerning death before retirement, survivor benefits, and forfeiture terms that appear unjust and inequitable. It is my understanding that the Act setting up the Provident Fund was an Act of the Government of Canada and that the C.N.R. does not have the power to change it.

In my judgement, the matter is outside my terms of reference and I do not know which agency of government is responsible. I can only urge that prompt and serious attention be directed to this unfortunate situation.

Under my terms of reference, provision was made for appointing a panel of independent, qualified actuaries to advise me with respect to item 4 and with respect to the cost of any findings and recommendations I might make. At the outset of my work, I approached three outstanding individuals who agreed to serve in this capacity. However, as my work progressed it became apparent that the extensive actuarial and technical work upon which my recommendations would be based would, by its nature, be unavailable until towards the end of my Inquiry. In the circumstances, it seemed inap-

propriate to further delay submission of my report to provide for another level of actuarial assessment, however desirable and beneficial that might have been. I have also been influenced in this matter by the careful and thorough work done by Paterson, Cook Limited on behalf of the Commission and the close co-operation they have received from the consulting actuaries to the C.N.R. and the C.P.R. The provision of sensitivity studies indicating a range of actuarial assumptions and costs should go a long way to resolving any differences in opinion, which might otherwise have been done by a panel of actuaries. It should also be pointed out that Dr. Phelim Boyle who advised me on a number of matters is himself a qualified actuary. All of these factors seemed to mitigate against activating the actuarial panel.

My Inquiry has of necessity concentrated on the pension problems of the two major railways and their various individually and jointly-controlled subsidiaries. I have given little thought for example, to the pension plan of the Algoma Central Railway Company. In situations of this kind there are traditional relationships and I assume they will continue to prevail.

As I indicated at the beginning of my report, many misconceptions exist concerning the operation and administration of railway pension plans. It is true for example, that the C.N.R., prior to 1960, followed a terminal-funding method in making its contributions to the pension fund. It is also true that changes in actuarial assumptions led to a reduction in the unfunded liability of approximately \$371 million. I can only state to those who believe otherwise that these changes do not in any way reduce the Company's obligations under the pension plan.

Throughout my report I have tried to make my findings and observations as clear and as concise as possible in the hope of reducing misconceptions and misunderstandings. I have also attempted to conduct a thorough and painstaking study, so that problems could be identified and effective solutions found. I trust that I have succeeded in this task.

It remains for me to express my appreciation to those who have assisted me in my Inquiry, Paterson, Cook Limited, Dr. Phelim Boyle, Dr. John Evans, Miss Sharon Katz and Mr. Dennis Van Westerborg. I am indebted to them for their contributions, but I alone must accept responsibility for the results.

I should also express my appreciation to the C.N.R., the C.P.R., C.R.L.A., and their actuaries for their co-operation and to all of those making submissions to my

Inquiry - C.R.E.P.A. and many pensioners associations and individuals, both employees and pensioners. Finally, I would like to thank the many pensioners for their patience and understanding during my Inquiry.

All of this is respectfully submitted,

Dr. Noel A. Hall
Commissioner

Dated at Vancouver this 8th day of September, 1976

APPENDIX I

CLASSIFICATION AND ANALYSIS OF COMPLAINTS RECEIVED BY THE COMMISSION

CLASSIFICATION OF COMPLAINTS FROM INDIVIDUAL PENSIONERS

<i>Nature of Complaint or Suggestion</i>	<i>Frequency of Complaint</i>	<i>%</i>
Inflation has made pension inadequate	24	28
C.P.R. pensions (unlike (C.N.R.) never been escalated, particularly those before 1956	23	27
Pension improvements applied to actives but not to pensioners	12	14
Unions represent actives rather than retired	6	7
C.R.L.A. thought to represent pensioners best	2	2.5
C.P.R. pension incommensurate with service rendered	3	3.5
No pension credit for war service, layoffs, or for other technicalities	3	3.5
C.P.R. pension fund thought to be poorly invested or managed	2	2.5
 <i>Miscellaneous</i>		
Neglect of C.P.R. pensioners by both unions and management	1	
Pensions should be removed from collective bargaining	1	
Pensions should be negotiated	1	
C.P.R. pension not portable	1	
Newfoundland Government penalized those who joined C.N.R. plan	1	
Loss because C.P.R. pension based on last 10 years rather than 5	1	
Forced to contribute on English rather than Canadian pay; lower C.P.R. pension	1	
No interest on returned C.P.R. contributions before 1972	1	
No survivor pension for older C.P.R. pensioners	1	
Widow's C.P.R. pension should not cease on remarriage	1	
TOTAL	<u>85</u>	<u>100%</u>

NOTE

1. Number of complaints:	C.P.R. = 51
	C.N.R. = 11
	Other = 1
	TOTAL <u>63</u>

2. Some pensioners have lodged more than one complaint.

COMPLAINTS FROM INDIVIDUAL EMPLOYEES

<i>Nature of Complaint or Suggestion</i>	<i>Frequency of Complaint</i>	<i>%</i>
Pension not as good as C.P.P. or civil service.	4	10.5
Lower retirement age urged (said to ease unemployment)	4	10.5
Fully indexed pensions urged	3	8
Survivor pensions of 70% - 100% urged	3	8
Opposed to C.P.P. Integration	3	8
Compulsory C.N.R. plan is undemocratic; should be optional	3	8
Railway pensions should be uniform; the best should prevail	2	5
Employees need more information on pension changes	2	5
Has 35 years' service, yet not eligible for even early retirement	2	5
Job abolished after 25 years' service but before pensionable age	1	
C.P.R. pension credit denied on technicalities	1	
War service should be credited	1	
Inequality of treatment alleged in early retirement between management employees and rank-and-file	1	
Unions and insurance companies control pensions	1	
Unions lack the power to represent pensioners	1	
Unions trade off pension benefits for pay increases	1	
C.P.R. pension not portable	1	
Inflation erodes pensions	1	
C.P.R. pension inadequate	1	
I.P.E.I. plan lacks survivor benefit	1	
Post-retirement employment should not be penalized	1	
TOTAL <u>38</u>		<u>100%</u>

NOTE

Number of complaints:	C.N.R.	=	9
	C.P.R.	=	4
	N.A.R.	=	<u>2</u>
TOTAL			<u><u>15</u></u>

EMPLOYEE GROUPS OTHER THAN UNIONS

<i>Nature of Complaint or Suggestion</i>	<i>Frequency of Complaint</i>	<i>%</i>
Fully indexed pensions urged	2	20
Opposed to C.P.P. integration	2	20
Opposed to compulsory vesting	1	
2% urged for every year of service to maximum of 70%	1	
Pension should be based on best single year rather than 5 years	1	
Early retirement urged without penalty at age 55 and 30 years	1	
Survivor pensions of 100% urged	1	
Mistrust alleged between employees and both C.N.R. and unions	1	
TOTAL	<u><u>10</u></u>	<u><u>100%</u></u>

NOTE

2 groups: Shipley et al; Lauzier et al.

COMPLAINTS FROM WIDOWS

<i>Nature of Complaint or Suggestion</i>	<i>Frequency of Complaint</i>	<i>%</i>
Widow's pension inadequate	8	36
100% widow's pension urged	1	4.5
C.P.R. pension denied because less than 5 years since marriage	4	18
C.N.R. pension denied because less than 3 years since marriage	1	4.5
Objection to C.P.R. rule when widow 10, 15 years younger	2	9
Older C.P.R. pensioners excluded from plan improvements	3	14

C.P.R. pension compares unfavourably with C.N.R.	1	}	14
C.N.R. pension denied after husband injured (railway's fault)	1		
I.P.E.I. pension never received although contributions made	1		
TOTAL	<u>22</u>		<u>100%</u>

NOTE

Number of complainants: 16 individuals and C.R.E.P.A.

COMPLAINTS FROM DISABILITY PENSIONERS

<i>Nature of Complaint or Suggestion</i>	<i>Frequency of Complaints</i>	<i>%</i>
Disability pensions inadequate	2	50
Wife excluded because not married 3 years at retirement	1	25
1975 improvements should be extended to those who retired before age 65	1	25
TOTAL	<u>4</u>	<u>100%</u>

NOTE

Number of complainants: 4

COMPLAINTS FROM NON-CONTRIBUTORS

<i>Nature of Complaint or Suggestion</i>	<i>Frequency of Complaints</i>	<i>%</i>
Non-contributors' pension should be increased	4	40
C.P.R. pension denied after 23,35, 49 years' service because last re-entry was after age 40	3	30
Objection to excluding those over 40 from the plan	2	20
Wants 1959 C.N.R. plan re-opened so he can join	1	10
TOTAL	<u>10</u>	<u>100%</u>

NOTE

Number of complainants: 9 pensioners and employees; 1 union local.

COMPLAINTS FROM UNIONS (22 LOCALS)

<i>Nature of Complaint or Suggestion</i>	<i>Frequency of Complaint</i>	<i>%</i>
Fully indexed pensions urged	17	19
Survivor pensions of 75% urged	16	18
Opposed to C.P.P. integration	12	13
Early retirement urged without penalty at age 55 after 30, 35 years	9	10
Pension improvements should be extended to retired as well as actives	4	4
Supporting C.R.E.P.A. brief	3	3
Pensions should be removed from collective bargaining	3	3
Pensions should be bargained collectively	1	
Employee rather than General Chairmen representation urged	2	
Pensioner representation urged at bargaining table and on pension committee	2	
Government trustee urged for railway pensions	1	
Railway pensions should be uniform	2	
Procedure urged for purchasing credit for layoffs	2	
Pension credit for war service urged	1	
Illness reduces pension credit	1	
Income-averaging annuities proposed for higher-paid employees	1	30
Pension should be based on best 5 years	2	
Pension should be based on best 3 consecutive years	1	
2% urged per year of service up to 35	2	
Opposed to D.N.R. maximum of 70%	1	
2% urged per year of service before 1956	2	
Equal employer-employee contributions urged	2	
5% contributions proposed	2	
Compulsory retirement proposed at age 60	1	
Pension should not cease on widow's remarriage	1	
TOTAL	<u>91</u>	<u>100%</u>

COMPLAINTS FROM 34 PENSIONERS GROUPS

<i>Nature of Complaint or Suggestion</i>	<i>Frequency of Complaint</i>	<i>%</i>
Survivor pensions ranging from 75% - 100% urged	17	18
Older pensioners are ignored in favour of actives	13	14
Fully indexed pensions urged	10	11
Pensioners rather than General Chairmen representation urged	8	9
Pensioners should participate on bargaining pensions	3	4
2% urged for each year of service, retroactive	7	7
C.P.R. pensions (and increases) inadequate	6	6
Pension compares unfavourably with C.N.R.	5	5
Pension credit lost during Depression, strikes, war	5	5
C.P.R. pensions before 1956 never been raised	4	4
Benefits from non-contributors (before 1935) never been raised	1	
Opposed to rule that spouse be married 3, 5 years before retirement	3	
Opposed to reduction if spouse 10 years younger	1	
Widows should not lose pension on remarriage	1	
Lack of survivor benefits in I.P.E.I. pensions	2	
I.P.E.I. pensions inadequate	1	
Forfeiture of contributions on death after retirement in I.P.E.I. plan	1	
OAS should not be integrated with pension	2	
Opposed to compulsory retirement at age 65	1	
Opposed to early retirement <i>without</i> penalty	1	
No way of knowledge whether company contributes its share to fund	1	
C.N.R. pensions should be administered by Treasury Board	1	
TOTAL	94	100%

COMPLAINTS FROM C.R.E.P.A. (VARIOUS LOCALITIES)

<i>Nature of Complaint or Suggestion</i>	<i>Frequency of Complaint</i>	<i>%</i>
Opposed to C.P.P. integration	6	13
Fully indexed pensions urged	5	11
2% urged for every year of service (Ind.pre-1956)	5	11

<i>Nature of Complaint or Suggestion</i>	<i>Frequency of Complaint</i>	<i>%</i>
Survivor pensions of 75% urged	4	9
Pension improvements should not be traded off for wage increases	4	9
C.N.R. Pension Board should be independent of Board of Directors	4	9
C.N.R. Board of Directors unacceptable as trustees	2	
Early retirement urged without penalty at age 55 and after 30 years	3	
Estimate 70% D.N.R. maximum	2	
Matched (monthly) company contributions urged	2	
Negotiated contributions urged	1	
Permit members of the fund to borrow up to 85% of contributions at nominal interest for purposes such as home-buying	1	38
Railway pensions inferior to civil service	1	
Fund losses alleged through "deliberately poor investments"	1	
Fund investments should be (semi)-annually disclosed to members	1	
Pension should be based on best 3 years rather than 5	1	
Provision proposed for "buying back" war service credit	1	
Compulsory retirement at age 65 urged	1	
TOTAL	45	100%

APPENDIX 2

DETAIL OF EMPLOYEE DATA, OBSERVATIONS ON QUALITY, SAMPLING METHODS AND TESTS OF RELIABILITY – C.N.R. PLANS

Commission of Inquiry into Railway Pension Plans

Examination of the Employee and Pension Data

The valuation tapes we received contained 140 columns of information per record and the retirement, death and termination tape contained 512 columns per record. Some of the information was not relevant for purposes of our assignment and we were able to reduce the amount of information per record when we created our valuation file and our "exit" file from the tapes.

The active member records in our valuation file contain 18 distinct items of information such as identification number, date of birth, date of employment, earnings, contributions, age and marital status, codes for employment status, location, division and plan.

The pensioner records in our valuation file contain 31 distinct items of information per record describing the vital statistics of the pensioner and/or beneficiary, the amount of pension, the allowable service on which it was based, and the contractual form of the pension.

The retirement, death and termination records in our "exit" file contain nine distinct items of information describing vital statistics, employee classifications and the cause and date of the "exit".

We examined the information on the files by printing out all of the information contained in random samples and samples of records taken from near the front, the middle and the end of each of the tapes and corresponding samples from our valuation and exit files. These samples were examined in detail.

From the December 31, 1974 tapes we then determined how many missing entries there were in each of the columns and took column totals for each item of information. We also analyzed the various codes and determined which of the employee groups, divisions, etc. were represented in the 1959 plan active file and how many members were in each such classification.

Numerous questions arose during these examinations and we obtained additional explanations by phone from the CN and their actuaries on a number of occasions.

We then reconciled important details on the 1973 and 1974 files for random sample groups of records.

With the exception of the dead pensioner records and a relatively small number of invalid records which we deleted, we have found the valuation records to be generally reasonable and consistent, on the basis of the tests we have applied. Unfortunately, we were not able to reconcile the exit records closely with the valuation records.

The following paragraphs describe the more important findings from our examination of the data.

*Tape 1 (P5974) – Active Canadian
File as at December 31, 1974*

This file contained information on active Canadian Rail, Hotel and Telecommunication Division employees only (76,607 records).

The first 270 records did not follow the regular age order sequence of the rest of the file and were generally incomplete (138 missing birth dates, 135 missing entry dates, 264 missing annual rate of earnings, 186 missing actual 1974 earnings, and a number of codes and other information missing).

Considering the time available to us and the relatively small number of records involved, we eliminated the first 270 records from our file and therefore worked from a data base of 76,337 active Canadian records. We were advised by the actuaries retained by CN that the first 270 records were probably employees who entered the plan in 1974. The remaining data base contained full information on all dates of birth and entry and virtually all earnings information. Before deleting the 270 records, we examined a number of the codes. Tabulations of the group, change and position codes and missing information based on all 76,607 records on the original tapes are as follows.

		Number of Members
	Code	Classification
1.	<i>Group Codes</i>	
	0	Code not recorded
	1	Schedule (union members)
	2	Non-schedule
	3	Middle management
	4	Probationary
	5	Senior management
	6	Schedule – administrative
	Total	
	76,607	
2.	<i>Change Codes</i>	
	0	Code not recorded
	01-07	Terminated, deceased or retired
	10-15	Leaves, suspensions, layoffs
	20-43	Active employees
	44-99	Miscellaneous (active)
	Total	
	76,607	

<i>Code</i>	<i>Classification</i>	<i>Number of Members</i>
3. Position Codes		
0	Code not recorded	176
1	Permanent - regular	76,294
2	Permanent - regular relief	NIL
3	Permanent - part-time relief	1
4	Regular - seasonal	85
5	Temporary relief	8
6	Temporary - additional work	43
Total		<u>76,607</u>

<i>Code</i>	<i>Classification</i>	<i>Number of Zero Entries</i>
4. Summary of Missing Information		
2	Sex and Marital	139
3	Group	160
4	Change Code	3,223
5	Position	176
7	Y/M/D of Birth	138
10	Y/M/D of Entry (Hire)	135
12	CPP Duration	260
13	1974 Earnings	772
14	Contributions with Interest	5,428
16	Annual Earnings	264
17	Annual Contributions	264

Notes re Missing Information

1. Most of the zero earnings figures were for employees on leaves, layoffs and suspensions.
2. Virtually all of the zero contribution records were for employees in their first six months of employment.
3. Virtually all of the remaining zero entries were from the first 270 records, which we eliminated from our file.

Tape 3 (R74) Pensioner File as at December 31, 1974

This file contained information on pensions payable to pensioners, widows and estates.

A large number of records on this file represented pensioners who had died prior to 1974 but whose records were retained on the file. There were also a number of records for pensioners for whom the Government of Canada, rather than CN, is liable on the basis of long-standing Agreements and for supplemental pensions, outside of the pension plan. These records were eliminated, leaving a data base of 38,307 records, including 1,922 records which terminated during 1974 which we used for the mortality studies.

Tabulations of the plan, cause of retirement and type of pension are as follows.

<i>Code</i>	<i>Classification</i>	<i>Number of Pensions</i>
1. Plan Codes		
1	1935 Plan contributory	1,244
2	1935 Plan noncontributory	4,008
5	1959 Plan	<u>33,055</u>
	Total	<u>38,307</u>

<i>Code</i>	<i>Classification</i>	<i>Number of Pensions</i>
2. Cause of Retirement		
<i>Codes</i>		
1	Age 65	19,833
2	Death-in-service	4,930
3	Disability	4,287
4	Early	8,808
5	Late	<u>449</u>
	Total	<u>38,307</u>

<i>Code</i>	<i>Classification</i>	<i>Number of Pensions</i>
3. <i>Type of Pension Codes</i>		
10	Single life guaranteed 5 years	279
20	Single life guaranteed 10 years	14,715
30	Single life guaranteed 15 years	40
40	Single life – no guarantee	6,096
50	Joint and last survivor –	
	no guarantee	91
52	Joint and last survivor –	
	guaranteed 10 years	16,587
90	Annuity certain	493
other	Miscellaneous	6
		<hr/>
	Total	38,307
		<hr/>

*Tape 5 (P3574) – 1935 Plan File Plus Supplemental Information
as at December 31, 1974*

This file contained information on 1935 plan active members, 1959 plan active U.S. members, and deferred pensioners in both plans, as well as supplemental information on active Canadian non-Rail employees.

These records were split into the basic 1935 plan active file (7,531 records) and the following miscellaneous files:

1. 1935 Plan Hotel Employees supplement – 102 records.
2. 1935 Plan Telecommunications Employees supplement – 207 records.
3. 1935 Plan Deferred Pensioners – 184 records.
4. 1959 Plan Hotel and Telecommunications Employees supplement – 5,316 records.
5. 1959 Plan Deferred Pensioners – 625 records.
6. 1959 Plan U.S. Employees – 491 records.

There was some overlapping of records on these files. The Hotel and Telecommunications workers were duplicated on the basic active files, coded as Canadian Rail employees.

Tabulations of the group change and position codes, and missing information on the 1935 plan active file are as follows.

<i>Code</i>	<i>Classification</i>	<i>Number of Members</i>
1. Group Codes		
0	Code not recorded	11
1	Schedule (union members)	6,675
2	Non-schedule	104
3	Middle management	329
4	Probationary	10
5	Senior management	4
6	Schedule – administrative	398
	Total	<u>7,531</u>
2. Change Codes		
0	Code not recorded	499
01-07	Terminated, deceased or retired	NIL
10-15	Leaves, suspensions, layoffs	996
20-43	Active employees	5,734
44-99	Miscellaneous (active)	302
	Total	<u>7,531</u>
3. Position Codes		
0	Code not recorded	11
1	Permanent – regular	7,507
2	Permanent – regular relief	NIL
3	Permanent – part-time relief	NIL
4	Regular – seasonal	6
5	Temporary relief	2
6	Temporary – additional work	5
	Total	<u>7,531</u>

<i>Code</i>	<i>Classification</i>	<i>Number of Members</i>
4.	<i>Summary of Missing Information</i>	
2	Sex and Marital	8
3	Group	11
4	Change Code	499
5	Position	11
7	Y/M/D of Birth	9
10	Y/M/D of Entry	9
13	1974 Earnings	730
14	Contributions with Interest	6,813
16	Annual Earnings	21
17	Annual Contributions	6,872

Exit File - 1974

This file contained information on active members who left the 1959 Plan or the 1935 Plan in 1974 (17,417 records). A reconciliation of the 1959 Plan experience file and of the total exit file is as follows:

<i>1959 Plan Experience File</i>	<i>Number of Records</i>
Used for experience studies:	
- age retirements	1,081
- disability retirements	254
- deaths	314
- terminations	<u>7,067</u>
Total included in experience studies	8,716
Excluded because not full-time permanent employees	2,254
Excluded because date of birth missing	<u>54</u>
Total 1959 Plan experience file	11,028
Total 1935 Plan experience file	<u>6,389</u>
Total exit file	<u>17,417</u>

Section 2 – Employee Data

Examination of Data – General Observations

We obtained magnetic tapes containing the basic employee and pensioner data for an actuarial valuation from the Montreal office of William M. Mercer Limited, the actuarial firm retained by the CNR.

They provided us with six tapes:

1. Active Canadian members of the 1959 plan as at December 31, 1974 – 76,607 records.¹
2. Active Canadian members of the 1959 plan as at December 31, 1973 – 71,234 records.¹
3. All pensioners, widows and estates at December 31, 1974 – 59,932 records.²
4. All pensioners, widows and estates at December 31, 1973 – 55,803 records.²
5. All active members of the 1935 plan as at December 31, 1974 – 7,531 records.¹
6. All active members of the 1935 plan as at December 31, 1973 – 7,194 records.
7. Retirements, terminations and deaths from both plans during 1974 – 17,427 records.

The December, 1973 files which we received had been used by the CN's actuaries for actuarial cost estimates and had been subject to considerable editing and testing. The December, 1974 files had not previously been used for cost estimates and had been subject to only limited editing and testing.

We conducted a number of tests on the data, as discussed below and in Appendix B, to test for general reasonableness and for internal consistency of the data. No independent audit of the data has been made to test for completeness of the data or to check any of the computerized records against source documents.

¹ Data on special groups of members in the 1959 plan such as deferred pensioners, U.S. employees and employees of divisions other than Rail were included on the 1935 tapes.

² The pensioner tapes contain several thousand records for deceased former pensioners and others for whom the 1935 and 1959 pension plans are not liable. In total, there were 36,385 valid records for CN pensions as at December 31, 1974.

³ There were more 1935 plan active records at December 31, 1974 than at December 31, 1973 due to some omissions in the December 31, 1973 records which were detected by CN during 1974 and added to the file.

We initially asked for data spanning a four- or five-year period for purposes of examining rates of mortality, turnover, salary increases and other experience under the plan. Unfortunately, only year-end 1973 and 1974 data was available and our experience analysis is therefore limited to one year. The information on one year is still useful but is less valuable than information covering a longer time span.

Data Problems

The CN employee data files are large and cumbersome. The *valuation data* is kept as only one part of a much larger multi-purpose personnel and payroll data file. In designing the data system, it appears that a number of compromises have been made in an attempt to accommodate the several purposes of the file.

Experience data on the active members is produced annually by CN for most but not all of the employee groups covered by the pension plan. This experience data includes statistics, by age, on employees who terminate their active status through death or termination of employment but not on those who retire. In order to obtain experience statistics for all active members on all causes of terminating active status, we requested and obtained, from CN, a separate computer tape with information on employees who terminated active status during 1974. This tape was in a different format from the valuation tapes we had been provided earlier, although the data came from the same file system, according to the information we received from CN.

We encountered a number of difficulties and discrepancies with both the valuation data and the experience data due to the design of the file system and the manner in which it appears to be administered. Examples of these difficulties and discrepancies are discussed below. A description of the procedures and tests we applied is contained in Appendix B.

Valuation Data

There appears to be several hundred older records (members who had joined the plan from 1 to 20 years earlier) missing from the December 31, 1973 *active file* and a few hundred missing from the December 31, 1974 file. The first two to three hundred records in the active file are so incomplete that they are useless for valuation purposes. Some data is missing, some mislabelled. The documentation describing the files is not kept up-to-date.

The *pensioners and survivors* file contains thousands of dead records and records of pensions for which the CN 1935 and 1959 pension plans are not liable. This file contains no record of past earnings, contribution deficiencies, or original amounts of pension. New pensioners and widows are given new identification numbers and no cross-reference is kept of the previous active number.

The *deferred pensioner* file contains no record of earnings or of the amount of the deferred pension.

Each of these items taken separately may not appear too serious but taken collectively they indicate possible errors or omissions of as much as 1% or 2% of the file, they make the files very difficult to reconcile externally to other sources of data or internally from one year to the next, they do not permit an accurate valuation of current deferred pension liabilities nor do they permit easy analysis of the cost of possible changes in benefits for pensioners and survivors.

Experience Data

The analysis of mortality experience among *pensioners and survivors* was conducted using only the December 31, 1973 and December 31, 1974 valuation files and assuming central occurrence of deaths in 1974 (i.e., assuming that all of the deaths occurred at July 1, 1974). The analysis of *active life experience* in 1974 required the December 31, 1973 and December 31, 1974 valuation files plus additional information on date of exit from active status and reason for exit (death, termination of employment, disability retirement, or other retirement) from the "exit" file which was prepared by CN at our request.

TABLE 2

*RECONCILIATION OF DECEMBER 31, 1973 AND 1974
VALUATION FILES - CN 1959 PLAN -
ACTIVE CANADIAN EMPLOYEES*

Total records at December 31, 1973	71,234
LESS: unacceptable records	<u>204</u>
Acceptable records at December 31, 1973	71,030
PLUS: 1974 new entrants	17,312*
LESS: 1974 exits	<u>12,005**</u>
Acceptable records at December 31, 1974	<u>76,337</u>

We encountered three types of data problems with the active life experience data:

- missing information on some of the records

* Consists of: 12,540 who continued active at December 31, 1974
4,772 who subsequently terminated in 1974

17,312 total new entrants in 1974

**Consists of: 7,233 who were active members at December 31, 1973
4,772 who entered the plan in 1974

12,005 total exits in 1974

- some 1959 plan data coded as 1935 plan data
- serious reconciliation problems.

Reconciliation of experience Data

The experience tape contained 11,028 records listed as being 1959 plan records. From this number, we deleted 136 records of employees who were listed on the experience file as other than full-time permanent employees and who were not included on the December 31, 1973 valuation file. We then isolated the 4,772 records for members who entered in 1974 and subsequently ceased active membership in the same year, leaving 6,120 records which we tried to reconcile against the valuation files.

Unfortunately, when we tried to reconcile (a) the number of records removed from the valuation file between December 31, 1973 and December 31, 1974 (7,233) with (b) the number of records of active members at December 31, 1973 who were on the 1974 exit file (6,120), we found an unreconciled net difference of 1,113 records, as follows:

Number of records in both (a) and (b)	5,529
Number of records in (a) but not in (b)	1,704
Number of records in (b) but not in (a)	591
Net difference between (a) and (b)	1,113

To put this in perspective, a reconciliation of the December 31, 1974 valuation file is shown in Table 2, *opposite*.

The 591 records in (b) but not in (a) can be explained as being members who terminated active status toward the end of 1974 but whose change in status had not been processed through the administrative system in time to be deleted from the December 31, 1974 valuation file when it was prepared in early 1975. These 591 records were shown properly as 1974 exits on the "exit" tape which was prepared at our request in the fall of 1975.

In order to formulate a reasonable explanation of the 1,704 records in (a) but not in (b), we sent CN a list of 70 record numbers, including 45 of the record numbers, selected at random, out of the 1,704 unexplained records. We requested their staff to trace each of these records through their files for an explanation. The results of tracing the 45 records were as follows:

- still active at December 31, 1974 13
- terminated active status before 1974 12
- terminated active status in 1974 2

– terminated active status – date unknown	13
– record could not be traced	<u>5</u>
	<u>45</u>

Thus, out of the 45 records which were in (a) but not in (b), 13 should not have been in either (a) or (b), 12 should not have been in either (a) or (b) but their presence in (a) may be explained as above by the delay in processing changes of status through the administration system, 2 should have been included in both (a) and (b), and 18 cannot be found under the present administration and file systems.

Fortunately, for analytic purposes, the experience rates of exit calculated using data from the "exit" file for the numerators and data primarily from the valuation files for the denominators will consistently understate the actual rates of exit experienced in 1974 since changes to the numerators of the calculated rate have far more impact than changes to the denominators and the exit file definitely seems to understate the numerators.

Because of the difficulty in tracking down the unreconciled records, it is difficult to estimate the degree of understatement or whether the understatement is proportionate at all ages and for all types of exit. However, further examination indicates that the understatement seems to apply, at least to some degree, at all ages and to each type of exit.

More specifically, reference to the number of new disability pensioners and other pensioners entering the pensioner files in 1974 indicates that the rates of *disability* and of *other retirement* computed using the "exit" file may understate the actual rates by as much as 25% and 9%, respectively.

In interpreting the results of the active file experience analysis, we have therefore considered the 1974 experience rates of exit to be rough guides to the actual rates, and consistently on the low side of the actual rates. In forming our opinion as to reasonable valuation assumptions of active life exits, we have had to give more weight than normal to general population experience and experience under other employee groups.

Opinion Re Employee Data

In our opinion, on the basis of such tests as we have applied, the *December 31, 1974 valuation data* on the 1935 and 1959 plans appears reasonable for use as the input

⁴ The "exit" file did not distinguish disability retirements from other retirements. We segregated the disability retirements from the others using the lists of individual disability benefits approved and recorded in the CN Pension Board minutes. The use of this separate source of information introduced an additional source of inconsistency in the data on disability retirements.

data for the comparative cost estimates requested by the Commissioner. Apart from the discrepancies noted above, we have no reason to believe it is either incomplete or inaccurate in any material respect. Without an independent audit, however, we are unable to express an independent opinion relating to the overall sufficiency or reliability of the valuation data.

In our opinion, on the basis of such tests as we have applied, the *1974 active life experience data* is not acceptable on its own as a representation of the terminations from active status which occurred in 1974. Because of time constraints, we have found it necessary to proceed with the cost estimates using active life demographic assumptions which have been selected without the benefit of completely reconciled active life experience data.

Recommendation

On the basis of our experience working with the CN pension plan data system over the past few months, we recommend to the Commissioner that he include in his report a recommendation that the system of maintaining and processing the pension plan employee records be analyzed in depth and improved as necessary to provide greater accuracy, easier audit and reconciliation of records, efficient and prompt production of membership statistics and analysis of experience, and greater flexibility and speed in preparing actuarial valuations and cost estimates for possible plan amendments under consideration from time to time.

Section 5 – Choice of Actuarial Methods and Assumptions

In this section we discuss the choice of methods of valuation to be used for both the assets and liabilities of the plan and the actuarial assumptions to be adopted.

Sampling Procedure

To achieve reasonable economy and efficiency of data processing without materially reducing the quality of the estimates of liabilities and costs, we propose to conduct a thorough valuation of the liabilities for random samples of records of sufficient size to ensure representative results, and to generalize the results for the total plan from the valuation of the random samples.

We have generated December 31, 1974 random samples of 2,500 records from each of the 1959 plan Active Canadian file (76,337 records) and the pensioner files (38,307 records) and a random sample of 1,000 records from the 1935 plan file (7,531 records).

Appropriateness of the Sample

To test how representative our samples were, we compared a number of statistical measurements from the samples with the corresponding statistical measurements from the total files shown in Tables 6 to 11, *opposite*.

TABLE 12
CN VALUATION SAMPLE FILES

*99% CONFIDENCE INTERVALS FOR THE
MEANS OF SELECTED VARIABLES*

<u>VARIABLE</u>	<u>INTERVAL</u>	<u>TOTAL FILE</u>
CN 1959 PLAN ACTIVE CANADIAN FILE		
Age	38.42 - 39.80	39.26
Service	13.56 - 14.80	14.35
Actual 1974 Earnings	\$10,746 - \$11,232	\$10,932
Annual Rate of Earnings	\$10,617 - \$10,985	\$10,827
Proportion of Males	93.0% - 95.4%	93.9%
CN PENSIONER AND SURVIVOR FILE		
Monthly Pension	\$187.04 - \$204.32	199.50
Age	70.93 - 72.17	71.24
Years Retired	10.258 - 11.022	10.27
Proportion of Male Pensioners	53.4% - 58.6%	56.0%
Proportion of Female Pensioners	1.4% - 2.9%	2.3%
Proportion of In-Service Widows	9.3% - 12.5%	10.5%
Proportion of Pensioner's Widows	17.6% - 21.7%	19.1%
Proportion of Disabled	9.2% - 12.4%	11.2%
Proportion of Estates, etc.	0.02% - 1.0%	0.9%
CN 1935 PLAN ACTIVE FILE		
Age	50.41 - 51.69	51.11
Service	24.00 - 24.94	24.63
Actual 1974 Earnings	\$ 9,192 - \$ 9,893	\$ 9,560
Annual Rate of Earnings	\$ 9,224 - \$ 9,676	\$ 9,432
Proportion of Males	97.0% - 99.4%	97.8%

Statistical theory tells us that, based on the size of the total files and the mean value and standard deviation of our samples, in 99 samples out of 100 the means of the total files will fall within the ranges shown in Table 12, *opposite*.

The fact that the means of the total files fall within the 99% confidence intervals for each of the variables tested, together with a visual comparison of the statistics in Tables 6 to 11, leads us to conclude that our samples are reasonable.

The use of random samples is not a common procedure for use in actuarial valuations of pension plans in Canada. However, considering the number of independent records established under the plan and the procedure is, in our opinion, appropriate for this purpose and consistent with the degree of accuracy inherent in actuarial valuations and cost estimates.

APPENDIX 3

DETAILED ANALYSIS OF RUN #1 - C.N.R. PLANS

Commission of Inquiry into Railway Pension Plans

Detailed Analysis of Run #1

Run #1 is a summary of the results of an actuarial valuation of the CN Pension Plans as at January 1, 1975 based on the actuarial assumptions and methods described in Sections 2 and 3. The provisions of the plans as at January 1, 1975 are briefly summarized in Appendix A.

The following table presents the balance sheet results of Run #1 in more detail than is presented in Table 5.

*BALANCE SHEET WITH RESPECT TO
SERVICE TO DECEMBER 31, 1974
(in millions of dollars)*

	1935 Plan	1959 Plan	Total
1. Accrued liabilities with respect to active members for benefits on:			
Retirement	\$ 5	\$1,452	\$1,457
Disability	1	207	208
Death Before Retirement	*	79	79
Termination of Employment	*	(192)**	(192)
Active members' contribution accounts under Rule 115 and Rule 144, and liability for Company contributions under Rule 115	8	—	8
LESS: Members' contribution deficiencies	—	(35)	(35)
Accrued liabilities with respect to active members	\$14	\$1,511	\$1,525
2. Value of pensions in payment	16	579	595
3. Liability with respect to deferred pensions			2
4. Total accrued liabilities			\$2,122
5. Assets			<u>1,020</u>

	<i>1935 Plan</i>	<i>1959 Plan</i>	<i>Total</i>
6. Unfunded liabilities Item 4 – Item 5			\$1,102
7. Funded ratio (Item 5 ÷ Item 4) x 100%			48%
8. Annual amortization payment for 30 years			\$ 98.1

The following table presents an analysis of the current service contribution rate in more detail than is presented in Table 5.

CURRENT SERVICE "NORMAL" COSTS

	<i>1935 Plan</i> % of 1935 Plan Payroll	<i>1959 Plan</i> % of 1959 Plan Payroll	<i>Total</i> % of Combined Payroll
1. Current service costs for benefits on:			
Retirement	0.18%	7.38%	6.80%
Disability	0.07%	1.25%	1.15%
Death Before Retirement	0.09%	0.60%	0.56%
Termination of Employment	—	2.64%	2.44%
2. Members' current money-purchase contributions and liability for current Company contributions under Rule 115	0.95%	—	0.08%
3. Total current service contribu- tions			
Item 1 + Item 2	1.29%	11.87%	11.03%

* Less than \$0.5 million.

**The "entry age normal" level contribution rates are designed to finance *all* of the benefits by level contribu-
tions from entry age to retirement age. The retirement, disability and death components of the entry age
and normal contribution rate are more than sufficient to finance the benefit accruals at the younger ages and
therefore build up reserves to finance the higher costs of accruals at the older ages. Conversely, the termi-
nation component of the contribution is less than sufficient at the younger ages and more than sufficient at
the older ages and therefore builds up negative reserves.

	<i>1935 Plan</i> <i>% of</i> <i>1935 Plan</i> <i>Payroll</i>	<i>1959 Plan</i> <i>% of</i> <i>1959 Plan</i> <i>Payroll</i>	<i>Total</i> <i>% of</i> <i>Combined</i> <i>Payroll</i>
4. Members' current contributions	<u>0.55%</u>	<u>5.19%</u>	<u>4.83%</u>
5. Company contributions Item 3 - Item 4	0.74%	6.68%	6.20%

The Company's current service contribution rate as developed above for the benefits of the current plans can be expected to decline gradually to a long-term rate of approximately 5.5% of covered payroll from the effect of future new entrants to the plans. This is because the contribution rate developed with respect to the current members reflects the fact that a portion of their pension benefit was credited on the full 2% formula, whereas for members who join the plans after the inception of the Canada Pension Plan the pension will be integrated with the Canada Pension Plan *for all years of service*.

The current service contribution rate developed by this valuation at January 1, 1975 is considerably higher than the rate of 3.3% of covered payroll developed as at January 1, 1973 with respect to the members of the 1959 plan. This is attributable to both a number of changes in assumptions and in valuation method, and to the improvements in the benefit formula as at January 1, 1975 extending the 2% formula for service back to January 1, 1935.

APPENDIX 4
SENSITIVITY TESTS – C.N.R. PLANS

Section 6 – Sensitivity Tests

In addition to the main body of valuation results and cost estimates which have been presented in Section 5, we have performed a number of calculations to analyze the sensitivity of the results to certain changes in benefit and contribution limits, actuarial method, assumed rates of retirement, and economic assumptions. The results of these sensitivity tests are presented below.

For each sensitivity test, we have examined the effect on only three of the Runs, namely Run #1, Run #4 and Run #10.

Test 1. Introduction of a maximum pension limit of \$1,143 per year of service (up to a maximum of 35 years) and a maximum employee contribution limit of \$2,500 in any year.

	Run #1		Run #4		Run #10	
	Before Change	After Change	Before Change	After Change	Before Change	After Change
<u>Balance Sheet</u>						
Assets	\$1,020	\$1,020	\$1,020	\$1,020	\$1,020	\$1,020
Accrued Liabilities	2,122	2,069	2,375	2,321	4,224	4,160
Unfunded Liabilities	1,102	1,049	1,355	1,301	3,204	3,140
Funded Ratio	48%	49%	43%	44%	24%	25%
Annual Amortization						
Payment – 30 years	\$ 98.1	\$ 93.4	\$120.7	\$115.9	\$285.3	\$279.6
<u>Current Service Contributions for 1975</u>						
Employee	\$ 43.5	\$ 43.5	\$ 46.7	\$ 46.7	\$ 46.7	\$ 46.7
Company						
- \$	55.9	48.8	59.5	42.2	92.5	82.5
- % of covered payroll	6.20%	5.41%	6.60%	5.79%	10.26%	9.15%
<u>Total Company Contributions for 1975</u>						
- \$	\$154.0	\$142.2	\$180.2	\$168.1	\$377.8	\$362.1
- % of covered payroll	17.09%	15.78%	20.00%	18.65%	41.92%	40.18%

Test 2. No change to benefits but eliminate 35-year maximum period on employee contributions for cost estimates involving indexed benefits.

	Run #1		Run #4		Run #10	
	Before Change	After Change	Before Change	After Change	Before Change	After Change
<u>Balance Sheet</u>						
Assets	N/A	N/A	N/A	N/A	\$1,020	\$1,020
Accrued Liabilities	N/A	N/A	N/A	N/A	4,224	4,224
Unfunded Liabilities	N/A	N/A	N/A	N/A	3,204	3,204
Funded Ratio	N/A	N/A	N/A	N/A	24%	24%
Annual Amortization						
Payment – 30 years	N/A	N/A	N/A	N/A	\$285.3	\$285.3
<u>Current Service Contributions for 1975</u>						
Employee	N/A	N/A	N/A	N/A	\$ 46.7	\$ 46.7
Company						
– \$	N/A	N/A	N/A	N/A	92.5	83.4
– % of covered payroll	N/A	N/A	N/A	N/A	10.26%	9.25%
<u>Total Company Contributions for 1975</u>						
– \$	N/A	N/A	N/A	N/A	\$377.8	\$368.7
– % of covered payroll	N/A	N/A	N/A	N/A	41.92%	40.91%

*Test 3. Change of actuarial method from "entry age normal" to "current cost method"**.*

*Current cost method – under the "current cost method", we have changed the method of determining current service costs and accrued liabilities for the 1959 plan (2%) benefits accruing or potentially accruing to currently active members of both plans. Under this method, the total (Company and member) current service cost for 1975 per employee is the present value of all estimated benefits to be paid to the member divided by the number of years of service from his or her date of plan entry to the estimated date of retirement. The accrued liability under this method is determined by multiplying each member's current service cost for 1975 by his or her number of years of service from date of plan entry to the valuation date (January 1, 1975). This "current cost method" is similar to the method employed for the actuarial valuation of the CN pension plans as at December 31, 1972.

	Run #1		Run #4		Run #10	
	Before Change	After Change	Before Change	After Change	Before Change	After Change
<u>Balance Sheet</u>						
Assets	\$1,020	\$1,020	\$1,020	\$1,020	\$1,020	\$1,020
Accrued Liabilities	2,122	2,159	2,375	2,397	4,224	4,225
Unfunded Liabilities	1,102	1,139	1,355	1,377	3,204	3,205
Funded Ratio	48%	47%	43%	43%	24%	24%
Annual Amortization						
Payment - 30 years	\$ 98.1	\$101.4	\$120.7	\$122.6	\$285.3	\$285.4
<u>Current Service Contributions for 1975</u>						
Employee Company	\$ 43.5	\$ 43.5	\$ 46.7	\$ 46.7	\$ 46.7	\$ 46.7
- \$	55.9	42.9	59.5	47.3	92.5	87.1
- % of covered payroll	6.20%	4.76%	6.60%	5.25%	10.26%	9.66%
<u>Total Company Contributions for 1975</u>						
- \$	\$154.0	\$144.3	\$180.2	\$169.9	\$377.8	\$372.5
- % of covered payroll	17.09%	16.01%	20.00%	18.85%	41.92%	41.33%

Test 4. Doubling the assumed rates of retirement for cost estimates involving indexed benefits.

	Run #1		Run #4		Run #10	
	Before Change	After Change	Before Change	After Change	Before Change	After Change
<u>Balance Sheet</u>						
Assets	\$1,020	\$1,020	\$1,020	\$1,020	\$1,020	\$1,020
Accrued Liabilities	2,122	2,122	2,375	2,375	4,224	4,389
Unfunded Liabilities	1,102	1,102	1,355	1,355	3,204	3,369
Funded Ratio	48%	48%	43%	43%	24%	23%
Annual Amortization						
Payment - 30 years	\$ 98.1	\$ 98.1	\$120.7	\$120.7	\$285.3	\$300.0
<u>Current Service Contributions for 1975</u>						
Employee Company	\$ 43.5	\$ 43.5	\$ 46.7	\$ 46.7	\$ 46.7	\$ 46.7
- \$	55.9	55.9	59.5	59.5	92.5	95.6

	Run #1		Run #4		Run #10	
	Before Change	After Change	Before Change	After Change	Before Change	After Change
– % of covered payroll	6.20%	6.20%	6.60%	6.60%	10.26%	10.61%
<i>Total Company Contributions for 1975</i>						
– \$	\$154.0	\$154.0	\$180.2	\$180.2	\$377.8	\$395.6
– % of covered payroll	17.09%	17.09%	20.00%	20.00%	41.92%	43.90%

Test 5. Economic assumptions changed to:

	1975 to 1979	1980 to 1984	1985 and Later
Valuation Interest Rate	10%	8 1/2%	6 1/2%
General Salary Increases	11%	8 1/2%	6%
COLA	8%	5 1/2%	3%
YMPE Increase After 1986			6%

i.e., an increase of 1% per annum in the general salary increases and the long-term YMPE increases.

The sensitivity test results on this basis are:

	Run #1		Run #4		Run #10	
	Before Change	After Change	Before Change	After Change	Before Change	After Change
<i>Balance Sheet</i>						
Assets	\$1,020	\$1,020	\$1,020	\$1,020	\$1,020	\$1,020
Accrued Liabilities	2,122	2,174	2,375	2,434	4,224	4,297
Unfunded Liabilities	1,102	1,154	1,355	1,414	3,204	3,277
Funded Ratio	48%	47%	43%	42%	24%	24%
Annual Amortization						
Payment – 30 years	\$ 98.1	\$102.8	\$120.7	\$125.9	\$285.3	\$291.8
<i>Current Service Contributions for 1975</i>						
Employee	\$ 43.5	\$ 43.5	\$ 46.7	\$ 46.7	\$ 46.7	\$ 46.7
Company						
– \$	55.9	70.9	59.5	75.8	92.5	113.8
– % of covered payroll	6.20%	7.87%	6.60%	8.41%	10.26%	12.63%

	Run #1		Run #4		Run #10	
	Before Change	After Change	Before Change	After Change	Before Change	After Change
<i>Total Company Contributions for 1975</i>						
-\$	\$154.0	\$173.7	\$180.2	\$201.7	\$377.8	\$405.6
-% of covered payroll	17.09%	19.27%	20.00%	22.38%	41.92%	45.01%

Test 6. Economic assumptions changed to:

	1975 to 1979	1980 to 1984	1985 and Later
Valuation Interest Rate	11%	9 1/2 %	7 1/2 %
General Salary Increases	11%	8 1/2 %	6%
COLA	8	5 1/2 %	3%
YMPE Increase After 1986			6%

i.e., an increase of 1% per annum in the valuation interest rates, the rates of general salary increases, and the long-term rates of increase in YMPE.

The sensitivity test results on this basis are:

	Run #1		Run #4		Run #10	
	Before Change	After Change	Before Change	After Change	Before Change	After Change
<i>Balance Sheet</i>						
Assets	\$1,020	\$1,020	\$1,020	\$1,020	\$1,020	\$1,020
Accrued Liabilities	2,122	1,883	2,375	2,107	4,224	3,711
Unfunded Liabilities	1,102	863	1,355	1,087	3,204	2,691
Funded Ratio	49%	54%	43%	48%	24%	27%
Annual Amortization						
Payment - 30 years	\$ 98.1	\$ 84.0	\$120.7	\$105.8	\$285.3	\$261.9
<i>Current Service Contributions for 1975</i>						
Employee	\$ 43.5	\$ 43.5	\$ 46.7	\$ 46.7	\$ 46.7	\$ 46.7
Company						
-\$	55.9	51.7	59.5	54.8	92.5	82.0
-% of covered payroll	6.20%	5.74%	6.60%	6.08%	10.26%	9.10%

	Run #1		Run #4		Run #10	
	Before Change	After Change	Before Change	After Change	Before Change	After Change
<i>Total Company Contributions for 1975</i>						
- %	\$154.0	\$135.7	\$180.2	\$160.6	\$377.8	\$343.9
- % of covered payroll	17.09%	15.06%	20.00%	17.82%	41.92%	38.16%

Test 7. Economic assumptions changed to:

	1975 to 1979	1980 to 1984	1985 and Later
Valuation Interest Rate	11%	9 1/2%	7 1/2%
General Salary Increases	11%	8 1/2%	6%
COLA	9%	6 1/2%	4%
YMPE Increase After 1986			6%

i.e., an increase of 1% per annum in the valuation interest rates, the rates of general salary increases, the cost-of-living increases, and the long-term rates of increase in YMPE.

The sensitivity test results on this basis are:

	Run #1		Run #4		Run #10	
	Before Change	After Change	Before Change	After Change	Before Change	After Change
<i>Balance Sheet</i>						
Assets	\$1,020	\$1,020	\$1,020	\$1,020	\$1,020	\$1,020
Accrued Liabilities	2,122	1,883	2,375	2,107	4,224	4,096
Unfunded Liabilities	1,102	863	1,355	1,087	3,204	3,076
Funded Ratio	48%	54%	43%	48%	24%	25%
Annual Amortization						
Payment - 30 years	\$ 98.1	\$ 84.0	\$120.7	\$105.8	\$285.3	\$299.4
<i>Current Service Contributions for 1975</i>						
Employee	\$ 43.5	\$ 43.5	\$ 46.7	\$ 46.7	\$ 46.7	\$ 46.7

	<i>Run #1</i>		<i>Run #4</i>		<i>Run #10</i>	
	<u>Before</u> <u>Change</u>	<u>After</u> <u>Change</u>	<u>Before</u> <u>Change</u>	<u>After</u> <u>Change</u>	<u>Before</u> <u>Change</u>	<u>After</u> <u>Change</u>
Company						
- \$	55.9	51.7	59.5	54.8	92.5	93.7
- % of covered payroll	6.20%	5.74%	6.60%	6.08%	10.26%	10.40%
<i>Total Company</i>						
<i>Contributions for 1975</i>						
- \$	\$154.0	\$135.7	\$180.2	\$160.6	\$377.8	\$393.1
- % of covered payroll	17.09%	15.06%	20.00%	17.82%	41.92%	43.62%

Test 8. Economic assumptions changed to:

	<i>1975</i>	<i>1980</i>	<i>1985</i>
	<i>to</i>	<i>to</i>	<i>and</i>
	<i>1979</i>	<i>1984</i>	<i>Later</i>
Valuation Interest Rate	7	7%	7%
General Salary Increases	5 1/2%	5 1/2%	5 1/2%
COLA	3 1/2%	3 1/2%	3 1/2%
YMPE Increase After 1986			5 1/2

i.e., a change in all of the economic assumptions to level annual rates - 1/2% higher than the "ultimate" rates.

The sensitivity test results on this basis are:

	<i>Run #1</i>		<i>Run #4</i>		<i>Run #10</i>	
	<u>Before</u> <u>Change</u>	<u>After</u> <u>Change</u>	<u>Before</u> <u>Change</u>	<u>After</u> <u>Change</u>	<u>Before</u> <u>Change</u>	<u>After</u> <u>Change</u>
<i>Balance Sheet</i>						
Assets	\$1,020	\$1,020	\$1,020	\$1,020	\$1,020	\$1,020
Accrued Liabilities	2,122	2,094	2,375	2,357	4,224	3,905
Unfunded Liabilities	1,102	1,074	1,355	1,337	3,204	2,885
Funded Ratio	48%	49%	43%	43%	24%	26%
Annual Amortization						
Payment - 30 years	\$ 98.1	\$ 83.6	\$120.7	\$104.1	\$285.3	\$224.6
<i>Current Service</i>						
<i>Contributions for 1975</i>						
Employee	\$ 43.5	\$ 43.5	\$ 46.7	\$ 46.7	\$ 46.7	\$ 46.7

	<i>Run #1</i>		<i>Run #4</i>		<i>Run #10</i>	
	<i>Before Change</i>	<i>After Change</i>	<i>Before Change</i>	<i>After Change</i>	<i>Before Change</i>	<i>After Change</i>
Company						
- \$	55.9	49.7	59.5	52.8	92.5	84.5
- % of covered payroll	6.20%	5.51%	6.60%	5.86%	10.26%	9.38%
<i>Total Company</i>						
<i>Contributions for 1975</i>						
- \$	\$154.0	\$133.3	\$180.2	\$156.9	\$377.8	\$309.1
- % of covered payroll	17.09%	14.79%	20.00%	17.41%	41.92%	34.30%

APPENDIX 5

DETAIL OF EMPLOYEE DATA, OBSERVATIONS ON QUALITY, SAMPLING METHODS AND TESTS OF RELIABILITY – C.P.R. PLAN

Section 2 – Employee Data

We obtained magnetic tapes and punched cards containing the basic employee and pensioner data for an actuarial valuation from the Montreal office of Towers, Perrin, Forster & Crosby, the actuarial firm retained by Canadian Pacific Limited.

They provided us with five tapes:

1. Active members as at January 1, 1975 – 41,635 records.
2. Active members as at January 1, 1973 – 39,664 records.
3. All pensioners, widows, and estates as at January 1, 1975 – 24,066 records.
4. All pensioners, widows, and estates as at January 1, 1973 – 22,912 records.
5. Retirements, terminations, and deaths during 1973 – 1974 – 18,966 records.

They also provided us with three sets of punched cards:

1. All deferred pensioners as at January 1, 1975 – 998 cards.
2. Deferred pensioners with monthly pensions computed, as at January 1, 1973 – 667 cards.
3. Deferred pensioners without monthly pensions computed, as at January 1, 1973 – 162 cards.

We conducted a number of tests on the data, as discussed below and in Appendix B, to test for general reasonableness and for internal consistency of the data. No independent audit has been made to *test for completeness* of the data, or to check any of the computerized records *against source documents*.

We initially asked for data spanning a four- or five-year period for purposes of examining rates of mortality, turnover, salary increases, and other experience under the plan. Unfortunately, only year-end 1972 and 1974 data was available, and our experience analysis is therefore limited to two years. In any event, the data spanning two years provides us with a significant amount of information concerning the recent experience under the plan.

Data Problems

In order to obtain experience statistics for all active members on all causes of terminating active status, we requested and obtained, from Canadian Pacific Limited, a

separate computer tape with information on employees who terminated active status in 1973 and 1974.

We encountered a number of difficulties and discrepancies with both the valuation data and the experience data due to the design of the file system and the manner in which it appears to be administered. Examples of these difficulties and discrepancies are discussed below.

A description of the procedures and tests we applied is contained in Appendix B.

Valuation Data

There appears to be a discrepancy in the interpretation of the meaning of annual "earnings" provided on the January 1, 1973 and January 1, 1975 *Active files*. The January 1, 1975 earnings figure for most members represents the *rate of earnings* as of that date, while the January 1, 1973 earnings figure represents the *actual earnings* during 1972. Because of this difference, we made compensating adjustments when conducting the salary scale studies described in Section 3.

Experience Data

The analysis of mortality experienced among *widows* was conducted using the January 1, 1973 and January 1, 1975 *pensioner files*, and assuming central occurrence of deaths during this period (i.e., assuming that all of the deaths occurred at January 1, 1974). The analysis of *active life experience* in 1973 – 1974 required the two active files plus additional information on date of exit from active status and reason for exit (death, termination of employment, disability retirement, or other retirement) from the "exit" file which was prepared by Canadian Pacific Limited at our request.

We encountered two types of data problems with the active life experience data:

- missing information on some of the records
- serious reconciliation problems.

Reconciliation of Experience Data

The "exit" tape contained 18,966 records, from which we isolated 11,187 records for members who both entered and ceased active membership in 1973 – 1974. This left us with 7,779 records which we tried to reconcile against the valuation files.

TABLE 1

*RECONCILIATION OF JANUARY 1, 1973 AND 1975
VALUATION FILES – CANADIAN PACIFIC LIMITED PLAN –
ACTIVE EMPLOYEES*

Total records at January 1, 1973	39,664
PLUS: 1973 – 1974 new entrants	21,391*
LESS: 1973 – 1974 exits	<u>19,420**</u>
Total records at January 1, 1975	<u>41,635</u>

Unfortunately, when we tried to reconcile (a) the number of records removed from the valuation file between January 1, 1973 and January 1, 1975 (8,233) with (b) the number of records of active members at January 1, 1973, who were on the "exit" file (7,779), we found an unreconciled net difference of 454 records, as follows:

Number of records in both (a) and (b)	6,565
Number of records in (a) but not in (b)	1,668
Number of records in (b) but not in (a)	1,214
Net difference between (a) and (b)	454

To put this in perspective, a reconciliation of the January 1, 1973 and January 1, 1975 valuation files is shown in Table 1, *opposite*.

The 1,214 records in (b) but not in (a) can be explained as being either:

– members who terminated active status during the period 1973 – 1974, but whose change in status had not been processed through the administrative system in time to be deleted from the January 1, 1975 active valuation file, or

– members who terminated active status during 1973 – 1974, who belonged to employee classifications not included on the January 1, 1973 active valuation file (i.e., leave of absence, layoff, transfers to CN telecommunications, and ship employees).

In order to formulate a reasonable explanation of the 1,668 records in (a) but not in (b), we sent to Canadian Pacific Limited a list of 50 record number, selected at random, out of the 1,668 unexplained records. We requested their staff to trace each of

* Consists of: 10,204 who continued active at January 1, 1975
11,187 who subsequently terminated in 1973 – 1974
21,391 total new entrants in 1973 – 1974

**Consists of: 6,233 who were active members at January 1, 1973
11,187 who entered the plan in 1973 – 1974
19,420 total exits in 1973 – 1974

these records through their files for an explanation. The results of tracing the 50 records were as follows:

– still active at January 1, 1975	11
– terminated active status before 1973	10
– terminated active status in 1973 – 1974	14
– terminated active status – date unknown	3
– never in Canadian Pacific Limited Pension Plan	12
	<hr/>
	50

Thus, out of the 50 records which were in (a) but not in (b), 23 should not have been in either (a) or (b); 10 should not have been in either (a) or (b) but their presence in (a) may be explained by the delay in processing changes of status through the administration system; 14 should have been included in both (a) and (b); and 3 cannot be categorized precisely.

Fortunately, for analytic purposes, the experience rates of exit calculated using from the "exit" file for the numerators, and data primarily from the valuation files for the denominators will consistently underestimate the actual rates of exit experienced in 1973 and 1974 since changes to the numerators of the calculated rates have far more impact than changes to the denominators, and the exit file clearly seems to underestimate the numerators.

Because of the difficulty in tracking down the unreconciled records, it is difficult to estimate the degree of understatement or whether the understatement is proportionate at all ages and for all types of exit. However, further examination indicates that the understatement seems to apply, at least to some degree, at a variety of ages and for both retirement and termination of employment.

In interpreting the results of the active file experience analysis, we have therefore considered the 1973 – 1974 experience rates of exit to be rough guides to the actual rates, and consistently on the low side of the actual rates. In forming our opinion as to reasonable valuation assumptions of active life exits, we have had to give more weight than normal to general population experience, and experience under other employee groups.

Opinion Re Employee Data

In our opinion, on the basis of such tests as we have applied, the *January 1, 1975 valuation data* appears reasonable for use as the input data for the comparative cost estimates requested by the Commissioner. Apart from the discrepancies noted above, we have no reason to believe it is either incomplete or inaccurate in any material respect. Without an independent audit, however, we are unable to express an independent opinion relating to the overall sufficiency or reliability of the valuation data.

TABLE 2
*VALUATION FILE - JANUARY 1, 1975
 AGE, SERVICE AND EARNINGS SUMMARY*

GROUP	NUMBER OF EMPLOYEES	ANNUAL RATE OF EARNINGS	AVERAGE AGE	AVERAGE YEARS OF SERVICE	ANNUAL RATE OF EARNINGS	PROPORTION OF FEMALES
Active Employees	41,635	\$517,139,530	40	16.3	\$12,421	4.6%
Deferred Pensioners	998	N/A	55	2.3	N/A	11.2%
GROUP	NUMBER OF PENSIONS		TOTAL MONTHLY PENSIONS	AVERAGE YEARS SINCE AGE RETIREMENT	AVERAGE MONTHLY PENSION	PROPORTION OF WIDOWS
Pensioners and Their survivors	24,066	\$4,432,381	72	8.7	\$184	31.2%

In our opinion, on the basis of such tests as we have applied, the 1973 - 1974 *active life experience data* is not acceptable on its own as a representation of the terminations from active status which occurred in 1973 - 1974. Because of time constraints, we have found it necessary to proceed with the cost estimates using active life demographic assumptions which have been selected without the benefit of completely reconciled active life experience data.

Recommendation

On the basis of experience working with the Canadian Pacific Limited pension plan data system over the past few months, we recommend to the Commissioner that he include in his report a recommendation that the system of maintaining and processing the pension plan employee records be analyzed in depth and improved as necessary to provide greater accuracy, easier audit and reconciliation of records, efficient and prompt production of membership statistics and analysis of experience, and greater flexibility in preparing actuarial cost estimates for possible plan amendments under consideration from time to time.

Summary of January 1, 1975 Valuation File

After editing the data on the January 1, 1975 files, as described in Appendix B, we established a valuation file as at January 1, 1975, to use as our base-year data for the valuation and cost estimates. Selected statistics extracted from the valuation file are displayed in Table 2, *opposite*:

Section 5 – Choice of Actuarial Methods and Assumptions

In this Section, we discuss the choice of methods of valuation to be used for both the assets and liabilities of the plan, and the actuarial assumptions to be adopted.

Sampling Procedure

To achieve reasonable economy and efficiency of data processing without materially reducing the quality of the estimates of liabilities and costs, we propose to conduct a thorough valuation of the liabilities for random samples of records of sufficient size to ensure representative results, and to generalize the results for the total plan from the valuation of the random samples.

We have generated January 1, 1975 random samples of 2,500 records each from the Active file and the pensioner file.

Appropriateness of the Samples

To test how representative our samples were, we compared a number of statistical measurements from the sample with the corresponding statistical measurements from the total file, shown in Tables 6 to 11, *opposite*.

Statistical theory tells us that, based on the size of the total files and the mean value and standard deviation of our samples, in 99 samples out of 100 the means of the total files will fall within the ranges shown in Table 12, *opposite*.

TABLE 6

*CANADIAN PACIFIC LIMITED PENSION PLAN -
JANUARY 1, 1975 - ACTIVE FILE
AGE, SERVICE AND EARNINGS SUMMARY*

<i>VALUATION SAMPLE FILE</i>		NUMBER OF EMPLOYEES	ANNUAL RATE OF EARNINGS	AVERAGE AGE	AVERAGE YEARS OF SERVICE	AVERAGE ANNUAL RATE OF EARNINGS
Male	2,383	\$ 29,432,590		40	16.5	\$12,351
Female	117	<u>1,223,601</u>		<u>36</u>	<u>9.9</u>	<u>10,458</u>
Total	2,500	<u><u>\$ 30,656,191</u></u>		<u><u>40</u></u>	<u><u>16.2</u></u>	<u><u>\$12,262</u></u>
<i>TOTAL FILE</i>						
Male	39,713	\$496,750,478		40	16.6	\$12,509
Female	1,922	<u>20,389,052</u>		<u>36</u>	<u>10.5</u>	<u>10,608</u>
Total	41,635	<u><u>\$517,139,530</u></u>		<u><u>40</u></u>	<u><u>16.3</u></u>	<u><u>\$12,421</u></u>

TABLE 7
STATISTICAL MEASUREMENTS AS AT JANUARY 1, 1975

	VALUATION SAMPLE FILE (2,500 EMPLOYEES)				TOTAL FILE (41,635 EMPLOYEES)			
	HIGHEST VALUE	LOWEST VALUE	MEAN VALUE	STANDARD DEVIATION	HIGHEST VALUE	LOWEST VALUE	MEAN VALUE	STANDARD DEVIATION
Age	66	16	40.09	13.98	66	15	40.29	14.02
Years of Service	49	0	16.20	13.25	51	0	16.25	13.06
Annual Rate of Turnings	\$53,266	\$1,218	\$12,262	\$3,438	\$175,667	\$1,008	\$12,421	\$3,919

TABLE 8

CANADIAN PACIFIC LIMITED PENSION PLAN -
 JANUARY 1, 1975 - RETIRED FILE
AGE, YEARS RETIRED, AND PENSION SUMMARY

	NUMBER OF PENSIONERS	TOTAL MONTHLY PENSION	AVERAGE AGE	AVERAGE YEARS RETIRED	AVERAGE PENSION
<i>VALIDATION SAMPLE FILE</i>					
Male	1,659	\$376,741	72	8.9	\$227
Female	<u>841</u>	<u>81,512</u>	<u>71</u>	<u>7.9</u>	<u>97</u>
Total	<u>2,500</u>	<u><u>\$458,253</u></u>	<u><u>72</u></u>	<u><u>8.5</u></u>	<u><u>\$183</u></u>
<i>TOTAL FILE</i>					
Male	15,922	\$3,642,557	73	9.0	\$229
Female	<u>8,144</u>	<u>789,824</u>	<u>71</u>	<u>8.0</u>	<u>97</u>
Total	<u>24,066</u>	<u><u>\$4,432,381</u></u>	<u><u>72</u></u>	<u><u>8.7</u></u>	<u><u>\$184</u></u>

TABLE 9

STATISTICAL MEASUREMENTS AS AT JANUARY 1, 1975

	VALUATION SAMPLE FILE (2,500 PENSIONERS)				TOTAL FILE (24,066 PENSIONERS)			
	HIGHEST VALUE	LOWEST VALUE	MEAN VALUE	STANDARD DEVIATION	HIGHEST VALUE	LOWEST VALUE	MEAN VALUE	STANDARD DEVIATION
Age	98	35	71.86	8.50	99	26	72.01	8.44
Years Retired	34	0	8.55	6.87	36	0	8.69	6.89
Monthly Pension	\$1,531	\$2	\$183	\$144	\$3,241	\$2	\$184	\$152

TABLE 10

CANADIAN PACIFIC LIMITED PENSION PLAN - JANUARY 1, 1975 - RETIRED FILE
COMPARISON OF PENSION CLASS DISTRIBUTION

	VALUATION SAMPLE FILE (2,500 PENSIONERS)		TOTAL FILE (24,066 PENSIONERS)	
	NUMBER OF PENSIONERS	%	NUMBER OF PENSIONERS	%
Normal Pensioners	1,043	41.7	10,163	42.2
Early Pensioners	339	13.6	3,205	13.3
Disabled Pensioners	346	13.8	3,195	13.3
Survivors	772	30.9	7,503	31.2
Total	2,500	100.0	24,066	100.0

TABLE 11

*CANADIAN PACIFIC LIMITED PENSION PLAN –
JANUARY 1, 1975 – RETIRED FILE – SAMPLE OF 2,500 LIVES
AGE, YEARS RETIRED AND PENSION SUMMARY BY PENSION CLASS*

PENSION CLASS	NUMBER OF PENSIONERS	TOTAL MONTHLY PENSION	AVERAGE AGE	AVERAGE YEARS RETIRED		AVERAGE MONTHLY PENSION
				YEARS RETIRED	AGE	
Normal Pensioners	1,043	\$216,844	75	10.3	54	\$208
Early Pensioners	339	101,572	68	5.4	300	
Disabled Pensioners	346	68,052	69	8.6	197	
Survivors of Pensioners	583	50,925	73	7.1	87	
Survivors of Employees	189	20,860	63	8.9	110	
Total	2,500	\$458,253	72	8.5		\$183

TABLE 12

*CANADIAN PACIFIC LIMITED VALUATION SAMPLE FILES**99% CONFIDENCE INTERVALS FOR THE
MEANS OF SELECTED VARIABLES*

<u>VARIABLE</u>	<u>99% CONFIDENCE INTERVAL</u>	<u>MEAN OF TOTAL FILE</u>
CANADIAN PACIFIC LIMITED ACTIVE FILE		
Age	39.37 – 40.81	40.29
Service	15.53 – 16.87	16.25
Annual Rate of Earnings	\$12,063 – \$12,462	\$12,421
Proportion of Males	94.2% – 96.4%	95.4%
CANADIAN PACIFIC LIMITED PENSIONER AND SURVIVOR FILE		
Monthly Pension	\$175.49 – \$191.11	\$184.18
Age	71.43 – 72.29	72.01
Years Retired	8.20 – 8.90	8.69
Proportion of Normal Pensioners	39.2% – 44.3%	42.2%
Proportion of Early Pensioners	11.8% – 15.3%	13.3%
Proportion of Disabled Pensioners	12.1% – 15.6%	13.3%
Proportion of Survivors	28.5% – 33.3%	31.2%
Proportion of Male Recipients	63.3% – 68.8%	66.2%

The fact that the means of the total files fall within the 99% confidence intervals for each of the variables tested, together with a visual comparison of the statistics in Tables 6 to 11, leads us to conclude that our samples are reasonable.

The use of random samples is not a common procedure for use in actuarial valuations of pension plans in Canada. However, considering the number of independent records established under the plan and the procedures followed in generating and testing the samples, the procedure is, in our opinion, appropriate for this purpose and consistent with the degree of accuracy inherent in actuarial valuations and cost estimates.

*Commission of Inquiry into Railway Pension Plans**Examination of the Employee and Pensioner Data*

The valuation tapes and the retirement, death and termination tape we received contained 60 columns per record. Some of the information was not relevant for purposes of our assignment and we were able to reduce the amount of information per record when we created our valuation file and our "exit" file from the tapes.

The active member records in our valuation file contain 12 distinct items of information such as identification number, date of birth, date of employment, earnings, contributions, codes for location, pension indicator, and salary scale.

The pensioner records in our valuation file contain 16 distinct items of information per record describing the vital statistics of the pensioner and/or beneficiary, the amount of pension, the allowable service on which it was based, and the contractual form of the pension.

The retirement, death and termination records in our "exit" file contain eight distinct items of information describing vital statistics, employee classifications and the cause and date of the "exit".

We have examined the information on the files by printing out all of the information contained in random samples and samples of records taken from near the front, the middle and the end of each of the tapes and corresponding samples from our valuation and exit files. These samples were examined in detail.

From the January 1, 1975 tapes we then determined how many missing entries there were in each of the columns and took column totals for each item of information. We also analyzed the various codes and determined which of the employee status codes, transfer codes, etc. were represented in the active file and how many members were in each such classification.

Numerous questions arose during these examinations and we obtained additional explanations by phone from Canadian Pacific Limited and their actuaries on a number of occasions.

We then reconciled important details on the 1973 and 1975 files for random sample groups of records.

We have found the valuation records to be generally reasonable and consistent, on the basis of the tests we have applied. Unfortunately, we were not able to reconcile the exit records closely with the valuation records.

The following paragraphs describe the above important findings from our examination of the data.

*TAPE 1 (CPLA75) - ACTIVE FILE
AS AT JANUARY 1, 1975*

This file contained information on active employees only (41,635 records). The file contained full information on all dates of birth and entry and virtually all earnings

information. Tabulations of the status and zone codes based on all 41,635 records are as follows.

<u>Code</u>	<u>Classification</u>	<u>Number of Members</u>
1. Status Codes		
1	Opted Out	1,063
2	Non-Contributor	56
3	Contributor	38,902
4	Reached Maximum	18
5	Leave of Absence	496
6	Laid Off	786
7	Ship Employees on Lay Off	71
8	Transfer to Telecommunications	140
9	Unions Reps (Contrib)	<u>103</u>
Total		<u>41,635</u>
2. Zone Codes		
0	Code not recorded	3,615
1	Canadian	37113
2	International	619
3	U.S.A.	286
4	Unknown	<u>2</u>
Total		<u>41,635</u>

Tape 3 (CPLR 75) – Pensioner File as at January 1, 1975

This file contained information on pensions payable to pensioners, widows and estates (24,066 records). Tabulations of the currency and pension codes are as follows.

<u>Code</u>	<u>Classification</u>	<u>Number of Pensions</u>
1. Currency Codes		
1	British	469
2	Canadian	<u>23,597</u>
Total		<u>24,066</u>

<u>Code</u>	<u>Classification</u>	<u>Number of Pensions</u>
2. <i>Pension Codes</i>		
11	Normal Life Only	3,356
12	Normal Joint (50% to Survivor)	6,807
21	Voluntary (Early) Life Only	725
22	Voluntary Joint (50% to Survivor)	2,480
31	Disability Life Only	1,020
32	Disability Joint (50% to Survivor)	2,175
43	Survivor of Pre-1953 Retiree	270
53	Survivor-Pension Stops at age 70	110
63	Survivor or Pensioner	5,257
73	Survivor of Employee	1,866
	Total	<u>24,066</u>

Exit File - 1973 - 1974

This file contained information on active members who left the Canadian Pacific Limited Pension Plan in 1973 - 1974 (18,966 records). The disability retirements were not separated from the age retirements on the tape, so we assumed a disabled retirement as being:

- all retirement records with age at retirement less than 60, and
- any other retirement records with age at retirement less than 65, and service less than 25 years.

A reconciliation of this file is as follows.

<u>Classification</u>	<u>Number of Records</u>
Age Retirements	2,141
Disability Retirements	407
Deaths	387
Terminations	<u>16,031</u>
Total	<u>18,966</u>

APPENDIX 6

DETAILED ANALYSIS OF RUN #1 – C.P.R. PLAN

Commission of Inquiry into Railway Pension Plans

Detailed Analysis of Run #1

Run #1 is a summary of the results of an actuarial valuation of the Canadian Pacific Limited Pension Plan as at January 1, 1975 based on the actuarial assumptions and methods described in Sections 2 and 3. The provisions of the plan as at January 1, 1975 are briefly summarized in Appendix A.

The following table presents the balance sheet results of Run #1 in more detail than is presented in Table 5.

*BALANCE SHEET WITH RESPECT TO
SERVICE TO DECEMBER 31, 1975
(in millions of dollars)*

1. Accrued liabilities with respect to active members for benefits on:	
Retirement	\$ 92
Disability	120
Death Before Retirement	52
Termination of Employment	<u>(161)*</u>
Accrued liabilities with respect to active members	\$1,003
2. Value of pensions in payment	379
3. Liability with respect to deferred pensions	<u>1</u>
4. Total accrued liabilities	\$1,383
5. Assets	<u>620</u>
6. Unfunded liabilities: Item 4 – Item 5	\$ 763
7. Funded ratio: (Item 5 ÷ Item 4) x 100%	45%
8. Annual amortization payment for 30 years	\$ 67.9

*The "entry age normal" level contribution rates are designed to finance all of the benefits by level contributions from entry age to retirement age. The retirement, disability and death components of the entry age normal contribution rate are more than sufficient to finance the benefit accruals at the younger ages and therefore build up reserves to finance the higher costs of accruals at the older ages. Conversely, the termination component of the contribution is less than sufficient at the younger ages and more than sufficient at the older ages and therefore builds up negative reserves.

The following table presents an analysis of the current service contribution rate in more detail than is presented in Table 5.

CURRENT SERVICE "NORMAL" COSTS

	<u>% of Payroll</u>
1. Current service costs for benefits on:	
Retirement	3.84%
Disability	0.66%
Before Retirement	0.31%
Termination of Employment	<u>4.57%</u>
Total	9.38%
2. Administration expenses: 5% x Item 4	<u>023%</u>
3. Total current service contributions:	
Item 1 + Item 2	9.61%
4. Members' current contributions	<u>4.53%</u>
5. Company contributions: Item 3 – Item 4	5.08%

The Company's current service contribution rate as developed above for the benefits of the current plan can be expected to decline gradually to a long-term rate of approximately 4.9% of covered payroll from the effect of future new entrants to the plan. This is because the contribution rate developed with respect to the current members reflects the fact that a portion of their pension benefit was credited on the full 2% formula, whereas for members who join the plan after the inception of the Canada Pension Plan the pension will be integrated with the Canada Pension Plan *for all years of service*.

The current service contribution rate developed by this valuation at January 1, 1975 is considerably higher than the rate of 3.6% of covered payroll developed as at January 1, 1973. This is attributable to both a number of changes in assumptions and in valuation method, and to the improvements in the benefit formula as at January 1, 1975 extending the 2% formula for service back to January 1, 1937.

APPENDIX 7
SENSITIVITY TESTS – C.P.R. PLAN

Section 6 – Sensitivity Tests

In addition to the main body of valuation results and cost estimates which have been presented in Section 5, we have performed a number of calculations to analyze the sensitivity of the results to certain changes in benefit and contribution limits, actuarial method, assumed rates of retirement, and economic assumptions. The results of these sensitivity tests are presented below, in millions of dollars.

For each sensitivity test, we have examined the effect on only three of the Runs, namely Run #1, Run #3 and Run #7.

Test 1. *Introduction of a maximum pension limit of \$1,143 per year of service (up to a maximum of 35 years) and a maximum employee contribution limit of \$2,500 in any year.*

	Run #1		Run #3		Run #7	
	Before Change	After Change	Before Change	After Change	Before Change	After Change
<u>Balance Sheet</u>						
Assets	\$ 620	\$ 620	\$ 620	\$ 620	\$ 620	\$ 620
Accrued Liabilities	1,383	1,369	1,511	1,497	2,695	2,679
Unfunded Liabilities	763	749	891	877	2,075	2,059
Funded Ratio	45%	45%	41%	41%	23%	23%
Annual Amortization						
Payment – 30 years	\$ 67.9	\$ 66.7	\$ 79.3	\$ 78.1	\$184.8	\$183.4
<u>Current Service Contributions for 1975</u>						
Employee	\$ 23.2	\$ 23.2	\$ 23.2	\$ 23.2	\$ 23.2	\$ 23.2
Company						
- \$	26.0	25.3	26.0	25.3	33.8	32.8
- % of covered payroll	5.08%	4.94%	5.08%	4.94%	6.60%	6.40%
<u>Total Company Contributions for 1975</u>						
- \$	\$ 93.9	\$ 92.0	\$105.3	\$103.4	\$218.6	\$216.2
- % of covered payroll	18.33%	17.96%	20.56%	20.19%	42.68%	42.21%

Test 2. No change to benefits but eliminate 35-year maximum period on employee contributions for cost estimates involving indexed benefits.

	Run #1		Run #3		Run #7	
	Before Change	After Change	Before Change	After Change	Before Change	After Change
<u>Balance Sheet</u>						
Assets	N/A	N/A	N/A	N/A	\$ 620	\$ 620
Accrued Liabilities	N/A	N/A	N/A	N/A	2,695	2,696
Unfunded liabilities	N/A	N/A	N/A	N/A	2,075	2,076
Funded Ratio	N/A	N/A	N/A	N/A	23%	23%
Annual Amortization						
Payment – 30 years	N/A	N/A	N/A	N/A	\$184.8	\$184.9
<u>Current Service Contributions for 1975</u>						
Employee	N/A	N/A	N/A	N/A	\$ 23.2	\$ 25.0
Company						
– \$	N/A	N/A	N/A	N/A	33.8	28.7
– % of covered payroll	N/A	N/A	N/A	N/A	6.60%	5.60%
<u>Total Company Contributions for 1975</u>						
– \$	N/A	N/A	N/A	N/A	\$218.6	\$213.6
– % of covered payroll	N/A	N/A	N/A	N/A	42.68%	41.70%

*Test 3. Change of actuarial method from "entry age normal" to "current cost method"**.*

	Run #1		Run #3		Run #7	
	Before Change	After Change	Before Change	After Change	Before Change	After Change
<u>Balance Sheet</u>						
Assets	\$ 620	\$ 620	\$ 620	\$ 620	\$ 620	\$ 620
Accrued Liabilities	1,383	1,345	1,511	1,473	2,695	2,589
Unfunded Liabilities	763	725	891	853	2,075	1,969

*Current cost method – under the "current cost method", we have changed the method of determining current service costs and accrued liabilities for the benefits accruing or potentially accruing to currently active members. Under this method, the total (Company and member) current service cost for 1975 per employee is the present value of all estimated benefits to be paid to the member divided by the number of years of service from his or her date of plan entry to the estimated date of retirement. The accrued liability under this method is determined by multiplying each member's current service cost for 1975 by his or her number of years of service from date of plan entry to the valuation date (January 1, 1975). The Company's current service contribution rate can be expected to increase markedly in future years, under this method.

	Run #1		Run #3		Run #7	
	Before Change	After Change	Before Change	After Change	Before Change	After Change
Funded Ratio	45%	46%	41%	42%	23%	24%
Annual Amortization						
Payment – 30 years	\$ 67.9	\$ 64.6	\$ 79.3	\$ 76.0	\$184.8	\$175.3
<i>Current Service Contributions for 1975</i>						
Employee Company	\$ 23.2	\$ 23.2	\$ 23.2	\$ 23.2	\$ 23.2	\$ 23.2
- \$	26.0	21.8	26.0	21.8	33.8	37.6
- % of covered payroll	5.08%	4.25%	5.08%	4.25%	6.60%	7.35%
<i>Total Company Contributions for 1975</i>						
- \$	\$ 93.9	\$ 86.4	\$105.3	\$ 97.8	\$218.6	\$212.9
- % of covered payroll	18.33%	16.87%	20.56%	19.09%	42.68%	41.56%

Test 4. Doubling the assumed rates of retirement for cost estimates involving indexed benefits.

	Run #1		Run #3		Run #7	
	Before Change	After Change	Before Change	After Change	Before Change	After Change
<i>Balance Sheet</i>						
Assets	N/A	N/A	N/A	N/A	\$ 620	\$ 620
Accrued Liabilities	N/A	N/A	N/A	N/A	2,695	2,779
Unfunded Liabilities	N/A	N/A	N/A	N/A	2,075	2,159
Funded Ratio	N/A	N/A	N/A	N/A	23%	22%
Annual Amortization						
Payment – 30 years	N/A	N/A	N/A	N/A	\$184.8	\$192.3
<i>Current Service Contributions for 1975</i>						
Employee Company	N/A	N/A	N/A	N/A	\$ 23.2	\$ 23.2
- \$	N/A	N/A	N/A	N/A	33.8	34.2
- % of covered payroll	N/A	N/A	N/A	N/A	6.60%	6.67%

	<i>Run #1</i>		<i>Run #3</i>		<i>Run #7</i>	
	<u>Before</u>	<u>After</u>	<u>Before</u>	<u>After</u>	<u>Before</u>	<u>After</u>
	<u>Change</u>	<u>Change</u>	<u>Change</u>	<u>Change</u>	<u>Change</u>	<u>Change</u>

*Total Company
Contributions for 1975*

-\$	N/A	N/A	N/A	N/A	\$218.6	\$226.5
-% of covered payroll	N/A	N/A	N/A	N/A	42.68%	44.22%

Test 5. Economic assumptions changed to:

	<u>1975</u>	<u>1980</u>	<u>1985</u>
	<u>to</u>	<u>to</u>	<u>and</u>
	<u>1979</u>	<u>1984</u>	<u>Later</u>
Valuation Interest Rate	10%	8½%	6½%
General Salary Increases	11%	8½%	6%
COLA	8%	5½%	3%
YMPE Increase After 1986			6%

i.e., an increase of 1% per annum in the general salary increases and the long-term YMPE increases.

The sensitivity test results on this basis are:

	<i>Run #1</i>		<i>Run #3</i>		<i>Run #7</i>	
	<u>Before</u>	<u>After</u>	<u>Before</u>	<u>After</u>	<u>Before</u>	<u>After</u>
	<u>Change</u>	<u>Change</u>	<u>Change</u>	<u>Change</u>	<u>Change</u>	<u>Change</u>
<i>Balance Sheet</i>						
Assets	\$ 620	\$ 620	\$ 620	\$ 620	\$ 620	\$ 620
Accrued Liabilities	1,383	1,406	1,511	1,534	2,695	2,736
Unfunded Liabilities	763	786	891	914	2,075	2,116
Funded Ratio	45%	44%	41%	40%	23%	23%
Annual Amortization						
Payment – 30 years	\$ 67.9	\$ 70.0	\$ 79.3	\$ 81.4	\$184.8	\$188.4
<i>Current Service Contributions for 1975</i>						
Employee	\$ 23.2	\$ 23.2	\$ 23.2	\$ 23.2	\$ 23.2	\$ 23.2
Company						
-\$	26.0	34.0	26.0	34.0	33.8	43.4
-% of covered payroll	5.08%	6.64%	5.08%	6.64%	6.60%	8.47%

	Run #1		Run #3		Run #7	
	Before Change	After Change	Before Change	After Change	Before Change	After Change
<i>Total Company Contributions for 1975</i>						
- \$						
- % of covered payroll	\$ 93.9	\$104.0	\$105.3	\$115.4	\$218.6	\$231.8
	18.33%	20.30%	20.56%	22.53%	42.68%	45.25%

Test 6. Economic assumptions changed to:

	1975 to 1979	1980 to 1984	1985 and Later
Valuation Interest Rate	11%	9½%	7½%
General Salary Increases	11%	8 ½%	6%
COLA	8%	5½%	3%
YMPE Increase After 1986			6%

i.e., an increase of 1% per annum in the valuation interest rates, the rates of general salary increases, and the long-term rates of increase in YMPE.

The sensitivity test results on this basis are:

	Run #1		Run #3		Run #7	
	Before Change	After Change	Before Change	After Change	Before Change	After Change
<i>Balance Sheet</i>						
Assets	\$ 620	\$ 620	\$ 620	\$ 620	\$ 620	\$ 620
Accrued Liabilities	1,383	1,220	1,511	1,341	2,695	2,392
Unfunded Liabilities	763	600	891	721	2,075	1,772
Funded Ratio	45%	51%	41%	46%	23%	26%
Annual Amortization Payment – 30 years	\$ 67.9	\$ 58.4	\$ 79.3	\$ 70.2	\$184.8	\$172.5
<i>Current Service Contributions for 1975</i>						
Employee Company	\$ 23.2	\$ 23.2	\$ 23.2	\$ 23.2	\$ 23.2	\$ 23.2
- \$	26.0	27.8	26.0	27.8	33.8	34.4
- % of covered payroll	5.08%	5.42%	5.08%	5.42%	6.30%	6.71%

<u>Run #1</u>		<u>Run #3</u>		<u>Run #7</u>	
<u>Before</u>	<u>After</u>	<u>Before</u>	<u>After</u>	<u>Before</u>	<u>After</u>
<u>Change</u>	<u>Change</u>	<u>Change</u>	<u>Change</u>	<u>Change</u>	<u>Change</u>

*Total Company
Contributions for 1975*

-\$	\$ 93.9	\$ 86.2	\$105.3	\$ 98.0	\$218.6	\$206.9
-% of covered payroll	18.33%	16.83%	20.56%	19.13%	42.68%	40.39%

Test 7. Economic assumptions changed to:

	<u>1975</u> <i>to</i> <u>1979</u>	<u>1980</u> <i>to</i> <u>1984</u>	<u>1985</u> <i>and</i> <u>Later</u>
Valuation Interest Rate	11%	9½%	7½%
General Salary Increases	11%	8½%	6%
COLA	9%	6½%	4%
YMPE Increase After 1986			6%

i.e., an increase of 1% per annum in the valuation interest rates, the rates of general salary increases, the cost-of-living increases, and the long-term rates of increase in YMPE.

The sensitivity test results on this basis are:

	<u>Run #1</u>			<u>Run #3</u>		
	<u>Before</u>	<u>After</u>	<u>Change</u>	<u>Before</u>	<u>After</u>	<u>Change</u>
	<u>Change</u>	<u>Change</u>	<u>Change</u>	<u>Change</u>	<u>Change</u>	<u>Change</u>
<u>Balance Sheet</u>						
Assets	\$ 620	\$ 620	\$ 620	\$ 620	\$ 620	\$ 620
Accrued Liabilities	1,383	1,220	1,511	1,341	2,695	2,628
Unfunded Liabilities	763	600	891	721	2,075	2,008
Funded Ratio	45%	51%	41%	46%	23%	24%
Annual Amortization						
Payment – 30 years	\$ 67.9	\$ 58.4	\$ 79.3	\$ 70.2	\$184.8	\$195.5

*Current Service
Contributions for 1975*

Employee	\$ 23.2	\$ 23.2	\$ 23.2	\$ 23.2	\$ 23.2	\$ 23.2
Company						
-\$	26.0	27.8	26.0	27.8	33.8	37.1
-% of covered payroll	5.08%	5.42%	5.08%	5.42%	6.60%	7.24%

<i>Run #1</i>		<i>Run #3</i>		<i>Run #7</i>	
<u>Before</u>	<u>After</u>	<u>Before</u>	<u>After</u>	<u>Before</u>	<u>After</u>
<u>Change</u>	<u>Change</u>	<u>Change</u>	<u>Change</u>	<u>Change</u>	<u>Change</u>

*Total Company
Contributions for 1975*

-\$	\$ 93.9	\$ 86.2	\$105.3	\$ 98.0	\$218.6	\$232.6
-% of covered payroll	18.33%	16.83%	20.56%	19.13%	42.68%	45.41%

Test 8. Economic assumptions changed to:

	<i>1975</i>	<i>1980</i>	<i>1985</i>
	<i>to</i>	<i>to</i>	<i>and</i>
	<i>1979</i>	<i>1984</i>	<i>Later</i>
Valuation Interest Rate	7%	7%	7%
General Salary Increases	5½%	5½%	5½%
COLA	3½%	3½%	3½%
YMPE Increase After 1986			5½%

i.e., a change in all of the economic assumptions to level annual rates – ½% higher than the “ultimate” rates.

The sensitivity test results on this basis are:

<i>Run #1</i>		<i>Run #3</i>		<i>Run #7</i>	
<u>Before</u>	<u>After</u>	<u>Before</u>	<u>After</u>	<u>Before</u>	<u>After</u>
<u>Change</u>	<u>Change</u>	<u>Change</u>	<u>Change</u>	<u>Change</u>	<u>Change</u>
<i>Balance Sheet</i>					
Assets	\$ 620	\$ 620	\$ 620	\$ 620	\$ 620
Accrued Liabilities	1,383	1,380	1,511	1,525	2,695
Unfunded Liabilities	763	760	891	905	2,075
Funded Ratio	45%	45%	41%	41%	1,885
Annual Amortization					
Payment – 30 years	\$ 67.9	\$ 59.2	\$ 79.3	\$ 70.5	\$184.8
					\$146.8
<i>Current Service Contributions for 1975</i>					
Employee	\$ 23.2	\$ 23.2	\$ 23.2	\$ 23.2	\$ 23.2
Company					
-\$	26.0	25.9	26.0	25.9	33.8
-% of covered payroll	5.08%	5.06%	5.08%	5.06%	6.60%
					6.51%

		<i>Run #1</i>		<i>Run #3</i>		<i>Run #7</i>	
<i>Before</i>	<i>After</i>	<i>Before</i>		<i>Before</i>		<i>Before</i>	
<i>Change</i>		<i>Change</i>		<i>Change</i>		<i>Change</i>	

*Total Company
Contributions for 1975*

- \$	\$ 93.9	\$ 85.1	\$105.3	\$ 96.4	\$218.6	\$180.1
- % of covered payroll	18.33%	16.61%	20.56%	18.82%	42.68%	35.16%

APPENDIX 8

STATISTICS ON THE POVERTY LINE IN CANADA

Statistics on the Poverty Line in Canada

There are three different poverty lines in use in Canada. The first is Statistics Canada's. The second is used by the Special Senate Committee on Poverty and the third by the Canadian Council on Social Development.

The Statistics Canada definition considers any family or individual who has to spend more than 70% of its income on basic essentials to be living in poverty. The Statistics Canada figures are as follows - *Statistics Canada Updated Poverty Lines* as at Jan 1, 1975 (estimated)

<u>Family Size</u>	<u>Yearly Amount</u>	<u>Monthly Amount</u>
	\$	\$
1	2,520	210
2	4,199	350
3	5,038	420
4	5,877	490
5 or more	6,719	477

The Senate Committee Poverty Lines represent 56% of average Canadian family income.

Senate Committee Poverty Lines, Jan. 1, 1975

<u>Family Size</u>	<u>Yearly Amount</u>	<u>Monthly Amount</u>
	\$	\$
1	3,372	281
2	5,620	468
3	6,744	562
4	7,871	656
5	8,992	749
10	14,612	1,218

The poverty lines developed by the Canadian Council on Social Development lie between the first two. In this case the poverty line is represented by an income of one-half the Canadian family average.

Canadian Council on Social Development, Poverty Lines, Jan. 1, 1975

<u>Family Size</u>	<u>Yearly Amount</u>	<u>Monthly Amount</u>
1	3,012	251
2	5,020	418
3	6,024	502
4	7,028	586
5	8,032	669

6	9,036	753
10	13,052	1,088

Source of figures:

Canadian Fact Book on Poverty published by The Canadian Council on Social Development, 55 Parkdale Avenue, Box 3505, Station "C", Ottawa.

APPENDIX 9

TABLES OF DEMOGRAPHIC ASSUMPTIONS - C.P.R. PLAN

PENSIONERS AND SURVIVORS MORTALITY RATES

Age	Widows Combined Mortality and Re-Marriage Rates	Male Age	Female Age	Disability
		Pensioners and Widowers*	Pensioners Mortality Rates**	Pensioners Mortality Rates**
30	0.070000		0.000469	
31	0.067000		0.000499	
32	0.064000		0.000533	
33	0.061000		0.000569	
34	0.058000		0.000608	
35	0.055000		0.000651	
36	0.052000		0.000698	
37	0.049000		0.000750	
38	0.046000		0.000807	
39	0.043000		0.000869	
40	0.040000	0.001633	0.000938	0.020000
41	0.038000	0.001789	0.001013	0.020000
42	0.036000	0.002000	0.001094	0.020000
43	0.034000	0.002260	0.001186	0.020000
44	0.032000	0.002569	0.001286	0.020000
45	0.030000	0.002922	0.001397	0.022809
46	0.028000	0.003318	0.001519	0.028021
47	0.026000	0.003754	0.001654	0.032114
48	0.024000	0.004228	0.001802	0.035327
49	0.022000	0.004740	0.001967	0.037868
50	0.020106	0.005285	0.002151	0.039921
51	0.018839	0.005867	0.002324	0.041641
52	0.018801	0.006480	0.002520	0.043163
53	0.017581	0.007127	0.002738	0.044596
54	0.017529	0.007806	0.002982	0.046032
55	0.017798	0.008519	0.003256	0.047542
56	0.018344	0.009262	0.003574	0.049179
57	0.019117	0.010039	0.003948	0.050982
58	0.020073	0.010889	0.004388	0.052975
59	0.021165	0.011924	0.004901	0.055168
60	0.022348	0.013119	0.005489	0.057563
61	0.023581	0.014440	0.006156	0.060149
62	0.024826	0.015863	0.006898	0.062911
63	0.026050	0.017413	0.007712	0.065825

Age	Widows Combined Mortality and Re-Marriage Rates	Male Age	Female Age	Disability
		Pensioners and Widowers*	Mortality Rates**	Pensioners Mortality Rates
64	0.027223	0.019185	0.008608	0.068864
65	0.028323	0.021260	0.009563	0.071996
66	0.029334	0.023643	0.010565	0.075190
67	0.030248	0.026316	0.011621	0.078413
68	0.031054	0.029188	0.012877	0.081636
69	0.031794	0.032435	0.014461	0.084832
70	0.032455	0.036106	0.016477	0.087978
71	0.033078	0.040008	0.019000	0.091061
72	0.033706	0.043827	0.021911	0.094073
73	0.034394	0.047489	0.025112	0.097017
74	0.035210	0.051221	0.028632	0.099907
75	0.036236	0.055293	0.032385	0.102771
76	0.037571	0.060068	0.036408	0.105651
77	0.039328	0.065924	0.040769	0.108604
78	0.041638	0.072595	0.045472	0.111707
79	0.044648	0.079692	0.050616	0.115054
80	0.056085	0.087431	0.056085	0.119538
81	0.061853	0.095445	0.061853	0.131147
82	0.067936	0.103691	0.067936	0.143168
83	0.074351	0.112303	0.074351	0.155537
84	0.081501	0.121116	0.081501	0.168455
85	0.089179	0.130102	0.089179	0.181674
86	0.097468	0.139315	0.097468	0.195153
87	0.106453	0.148714	0.106452	0.208973
88	0.116226	0.158486	0.116226	0.223071
89	0.126893	0.168709	0.126893	0.237729
90	0.138577	0.179452	0.138577	0.253064
91	0.151192	0.190489	0.151192	0.269178
92	0.165077	0.201681	0.165077	0.285734
93	0.180401	0.212986	0.180401	0.302522
94	0.197349	0.226535	0.197349	0.319479
95	0.216129	0.241164	0.216129	0.339803
96	0.236970	0.256204	0.236970	0.361746
97	0.258059	0.272480	0.258059	0.384306
98	0.280237	0.290163	0.280237	0.408720
99	0.304679	0.309125	0.304679	0.435244
100	0.331630	0.329825	0.331630	0.463688
101	0.361361	0.352455	0.361361	0.494738
102	0.394167	0.377220	0.394167	0.528682

Age	Male Age		Female Age		Disability	
	Widows Combined Mortality and Re-Marriage Rates	Pensioners and Widowers*	Mortality Rates**	Pensioners	Mortality Rates**	Pensioners Mortality Rates
103	0.430366	0.406205		0.430366		0.565830
104	0.471522	0.441497		0.471522		0.609308
105	0.519196	0.485182		0.519196		0.662246
106	0.574950	0.539343		0.574950		0.727773
107	0.640345	0.606069		0.640345		0.809014
108	0.716944	0.687444		0.716944		0.909104
109	0.806309	0.785555		0.806309		1.000000
110	1.000000	1.000000		1.000000		

*We assumed no re-marriage rates for widowers because of insufficient data and because it would not have a serious effect on the cost estimates (less than 5% of the employees are female).

**1971 CAM Table.

RATES OF EARNINGS INCREASE, DISABILITY, PRE-RETIREMENT MORTALITY AND TERMINATION OF EMPLOYMENT

Age	Annual Earnings Increase Rates*	Male and Female Disability Rates	Pre-Retirement Male Mortality Rates**	Pre-Retirement Female Mortality Rates**	Male and Female Termination Rates
15	0.050	0.0000	0.000433	0.000193	0.5326
16	0.050	0.0000	0.000444	0.000205	0.4976
17	0.050	0.0000	0.000457	0.000218	0.4629
18	0.050	0.0000	0.000471	0.000231	0.4288
19	0.049	0.0000	0.000486	0.000245	0.3958
20	0.047	0.0000	0.000503	0.000260	0.3640
21	0.045	0.0000	0.000522	0.000275	0.3338
22	0.043	0.0000	0.000544	0.000292	0.3053
23	0.041	0.0000	0.000566	0.000309	0.2786
24	0.039	0.0000	0.000591	0.000327	0.2539

<i>Age</i>	<i>Annual Earnings Increase Rates*</i>	<i>Male and Female Disability Rates</i>	<i>Pre-Retirement Male Mortality Rates**</i>	<i>Pre-Retirement Female Mortality Rates**</i>	<i>Male and Female Termination Rates</i>
25	0.036	0.0000	0.000619	0.000347	0.2311
26	0.033	0.0000	0.000650	0.000368	0.2102
27	0.030	0.0000	0.000684	0.000390	0.1913
28	0.027	0.0000	0.000722	0.000414	0.1741
29	0.024	0.0000	0.000763	0.000440	0.1587
30	0.021	0.0000	0.000809	0.000469	0.1449
31	0.018	0.0000	0.000860	0.000499	0.1326
32	0.015	0.0000	0.000916	0.000533	0.1215
33	0.013	0.0000	0.000978	0.000569	0.1116
34	0.011	0.0000	0.001046	0.000608	0.1027
35	0.007	0.0000	0.001122	0.000651	0.0945
36	0.007	0.0000	0.001204	0.000698	0.0869
37	0.007	0.0000	0.001295	0.000750	0.0798
38	0.007	0.0000	0.001397	0.000807	0.0729
39	0.007	0.0000	0.001509	0.000869	0.0662
40	0.007	0.0007	0.001633	0.000938	0.0595
41	0.007	0.0007	0.001789	0.001013	0.0526
42	0.007	0.0008	0.002000	0.001094	0.0455
43	0.006	0.0008	0.002260	0.001186	0.0382
44	0.005	0.0009	0.002569	0.001286	0.0306
45	0.003	0.0013	0.002922	0.001397	0.0228
46	0.003	0.0019	0.003318	0.001519	0.0147
47	0.003	0.0026	0.003754	0.001654	0.0066
48	0.003	0.0035	0.004228	0.001802	
49	0.003	0.0045	0.004740	0.001967	
50	0.003	0.0055	0.005285	0.002151	
51	0.003	0.0070	0.005867	0.002324	
52	0.003	0.0085	0.006480	0.002520	
53	0.003	0.0100	0.007127	0.002738	
54	0.003	0.0115	0.007800	0.002982	
55	0.004	0.0130	0.008519	0.003256	
56	0.004	0.0145	0.009262	0.003574	
57	0.004	0.0155	0.010039	0.003948	
58	0.004	0.0165	0.010889	0.004388	
59	0.006	0.0175	0.011924	0.004901	
60	0.000	0.0180	0.013119	0.005489	
61	0.002	0.0170	0.014440	0.006156	
62	0.002	0.0160	0.015863	0.006898	

<i>Age</i>	<i>Annual Earnings Increase Rates*</i>	<i>Male and Female Disability Rates</i>	<i>Pre-Retirement Male Mortality Rates**</i>	<i>Pre-Retirement Female Mortality Rates**</i>	<i>Male and Female Termination Rates</i>
63	0.002	0.0150	0.017413	0.007712	
64	0.002	0.0140	0.019185	0.008608	

* Due to merit and promotion.

**1971 GAM table.

RATES OF RETIREMENT - MALES AND FEMALES
(Active Members)

<i>Age</i>	<i>Table A</i>	<i>Table B</i>	<i>Table C</i>
	<i>Non-Indexed Benefits Rate</i>	<i>Indexed Benefits Rate</i>	<i>For Sensitivity Test of Rates of Retirement</i>
60	.20	.30	.60
61	.15	.20	.40
62	.18	.21	.42
63	.21	.22	.44
64	.24	.24	.48
65	1.00	1.00	1.00

Table A: Used in valuing present plan, and alternatives which do not include cost-of-living adjustments after retirement.

Table B: Used when valuing cost-of-living adjustments after retirement.

Table C: Used for test of sensitivity of rates of retirement on cost of indexed benefits.

APPENDIX 10

TABLES OF DEMOGRAPHIC ASSUMPTIONS - C.N. R. PLANS

Pensioners and Survivors Post-Retirement Mortality Rates

Age	Current Pensioners And Survivors		Future Pensioners and Survivors		Current and Future Pensioners Disabled Pensioners Mortality - Male and Female
	Male Age Pensioners and Widowers	Female Age Pensioners and Widowers	Male Age Pensioners and Widowers	Female Age Pensioners and Widowers	
	Mortality	Mortality	Mortality*	Mortality*	
36	0.001100	0.001100	0.001204	0.000698	0.003000
37	0.001200	0.001200	0.001295	0.000750	0.003000
38	0.001300	0.001300	0.001397	0.000807	0.003000
39	0.001400	0.001400	0.001509	0.000869	0.003000
40	0.001500	0.001500	0.001633	0.000938	0.003000
41	0.001700	0.001700	0.001789	0.001013	0.003400
42	0.001900	0.001900	0.002000	0.001094	0.003800
43	0.002100	0.002100	0.002260	0.001186	0.004200
44	0.002400	0.002400	0.002569	0.001286	0.004800
45	0.002700	0.002700	0.002922	0.001397	0.005400
46	0.003100	0.003100	0.003318	0.001519	0.006200
47	0.003500	0.003500	0.003754	0.001654	0.007000
48	0.003900	0.003900	0.004228	0.001802	0.007800
49	0.004400	0.004400	0.004740	0.001967	0.008800
50	0.004900	0.004900	0.005285	0.002151	0.009800
51	0.005500	0.005500	0.005867	0.002324	0.011000
52	0.006000	0.006000	0.006480	0.002520	0.012000
53	0.006600	0.006600	0.007127	0.002738	0.013200
54	0.007300	0.007300	0.007806	0.002982	0.014600
55	0.007900	0.007900	0.008519	0.003256	0.015800
56	0.008600	0.008600	0.009262	0.003574	0.017200
57	0.009300	0.009300	0.010039	0.003948	0.018600
58	0.010100	0.010100	0.010889	0.004388	0.020200
59	0.010900	0.010900	0.011924	0.004901	0.021800
60	0.011700	0.011700	0.013119	0.005489	0.023400
61	0.016869	0.008278	0.014440	0.006156	0.025030
62	0.018199	0.009144	0.015863	0.006898	0.027193
63	0.019666	0.010112	0.017413	0.007712	0.029577
64	0.021283	0.011195	0.019185	0.008608	0.032202
65	0.023066	0.012406	0.021260	0.009563	0.035092
66	0.025030	0.013759	0.023643	0.010565	0.038272
67	0.027193	0.015272	0.026316	0.011621	0.041771
68	0.029577	0.016963	0.029188	0.012877	0.045620
69	0.032202	0.018853	0.032435	0.014461	0.049852
70	0.035092	0.020964	0.036106	0.016477	0.054501
71	0.038272	0.023321	0.040008	0.019000	0.059609
72	0.041771	0.025954	0.043827	0.021911	0.065216

Current Pensioners And Survivors		Future Pensioners And Survivors		Current And Future Pensioners
Male Age Pensioners and Widowers	Female Age Pensioners and Widows	Male Age Pensioners and Widowers	Female Age Pensioners and Widows	Disabled Pensioners Mortality – Male and Female
Age	Mortality	Mortality*	Mortality*	
73	0.045620	0.028892	0.047489	0.071368
74	0.049852	0.032171	0.051221	0.078113
75	0.054501	0.035829	0.055293	0.085503
76	0.059609	0.039907	0.060068	0.093593
77	0.065216	0.044451	0.065942	0.102443
78	0.071368	0.049513	0.072595	0.112113
79	0.078113	0.055147	0.079692	0.122669
80	0.085503	0.061415	0.087431	0.134178
81	0.093953	0.068383	0.095445	0.146709
82	0.102443	0.076121	0.103691	0.160333
83	0.112113	0.084707	0.112303	0.175124
84	0.112669	0.094224	0.121116	0.191151
85	0.134178	0.104760	0.130102	0.208485
86	0.146709	0.116409	0.139315	0.227192
87	0.160333	0.129270	0.148714	0.247332
88	0.175124	0.143445	0.158486	0.268960
89	0.191151	0.159040	0.168709	0.292118
90	0.208485	0.179161	0.179452	0.316834
91	0.227192	0.194913	0.190489	0.343122
92	0.247332	0.215399	0.201681	0.370973
93	0.268960	0.237714	0.212986	0.400352
94	0.292118	0.261943	0.226535	0.431199
95	0.316834	0.288153	0.241164	0.463415
96	0.343122	0.316391	0.256204	0.496870
97	0.370973	0.346674	0.272480	0.531389
98	0.400352	0.378985	0.290163	0.566757
99	0.431199	0.413266	0.309125	0.602714
100	0.463415	0.449400	0.329825	0.638956
101	0.500000	0.490000	0.352455	0.675000
102	0.540000	0.540000	0.377220	0.712000
103	0.600000	0.600000	0.406205	0.750000
104	0.670000	0.670000	0.441497	0.790000
105	0.760000	0.760000	0.485182	0.832000
106	0.860000	0.860000	0.539343	0.877000
107	0.970000	0.970000	0.606069	0.930000
108	1,000000	1.000000	0.687444	1.000000
109			0.785555	0.806309
110			0.999999	0.999999

*1971 Group Annuity Mortality Table.

RATES OF EARNINGS INCREASE AND PRE-RETIREMENT MORTALITY

<i>Age</i>	<i>Annual Earnings Increase Rates*</i>	<i>Active Male Rates of Mortality</i>	<i>Active Female Rates of Mortality **</i>
15	0.0500000	0.000600	0.000193
16	0.0475000	0.000600	0.000205
17	0.0450000	0.000600	0.000218
18	0.0425000	0.000600	0.000231
19	0.0400000	0.000600	0.000245
20	0.0383556	0.000600	0.000260
21	0.0366391	0.000600	0.000275
22	0.0350551	0.000600	0.000292
23	0.0336485	0.000600	0.000309
24	0.0323601	0.000600	0.000327
25	0.0312150	0.000600	0.000347
26	0.0301613	0.000600	0.000368
27	0.0292079	0.000600	0.000390
28	0.0283448	0.000700	0.000414
29	0.0275469	0.000700	0.000440
30	0.0268084	0.000800	0.000469
31	0.0261085	0.000800	0.000499
32	0.0254902	0.000900	0.000533
33	0.0248566	0.000900	0.000569
34	0.0242684	0.001000	0.000608
35	0.0237362	0.001000	0.000651
36	0.0232416	0.001100	0.000698
37	0.0227954	0.001200	0.000750
38	0.0223406	0.001300	0.000807
39	0.0218914	0.001400	0.000869
40	0.0213460	0.001500	0.000938
41	0.0206753	0.001700	0.001013
42	0.0198775	0.001900	0.001094
43	0.0189507	0.002100	0.001186
44	0.0179160	0.002400	0.001286
45	0.0167917	0.002700	0.001397
46	0.0156392	0.003100	0.001519
47	0.0145031	0.003500	0.001654
48	0.0134133	0.003900	0.001802
49	0.0123650	0.004400	0.001967
50	0.0113754	0.004900	0.002151
51	0.0104076	0.005500	0.002324
52	0.0094692	0.006000	0.002520
53	0.0085361	0.006600	0.002738
54	0.0075958	0.007300	0.002982

Age	Annual Earnings	Active Male	Active Female
	Increase Rates*	Rates of Mortality	Rates of Mortality **
55	0.0066360	0.007900	0.003256
56	0.0056650	0.008600	0.003574
57	0.0046706	0.009200	0.003948
58	0.0036405	0.010100	0.004388
59	0.0026225	0.010900	0.004901
60	0.0015934	0.011700	0.005489
61	0.0005603	0.012700	0.006156
62	0.0000000	0.013600	0.006898
63	0.0000000	0.014700	0.007712
64	0.0000000	0.016000	0.008608

RATES OF DISABILITY AND TERMINATION OF EMPLOYMENT

Age	Male Rates of Disability	Female Rates of Disability	Male Termination	Female Termination
15	0.000000	0.000000	0.5200000	0.5200000
16	0.000000	0.000000	0.4600000	0.5060000
17	0.000000	0.000000	0.4000000	0.4800000
18	0.000000	0.000000	0.3400000	0.4420000
19	0.000000	0.000000	0.2800000	0.3920000
20	0.000000	0.000000	0.2200000	0.3300000
21	0.000000	0.000000	0.2000000	0.3200000
22	0.000000	0.000000	0.1800000	0.3060000
23	0.000000	0.000000	0.1600000	0.2880000
24	0.000000	0.000000	0.1400000	0.2660000
25	0.000000	0.000000	0.1200000	0.2400000
26	0.000000	0.000000	0.1090000	0.2180000
27	0.000000	0.000000	0.0970000	0.1940000
28	0.000000	0.000000	0.0870000	0.1740000
29	0.000000	0.000000	0.0770000	0.1540000
30	0.000000	0.000000	0.0670000	0.1340000
31	0.000000	0.000000	0.0632794	0.1265588
32	0.000000	0.000000	0.0595564	0.1191128
33	0.000000	0.000000	0.0558333	0.1116666
34	0.000000	0.000000	0.0521114	0.1042228
35	0.000000	0.000000	0.0483880	0.0967760
36	0.000000	0.000500	0.0446664	0.0893328
37	0.000000	0.001000	0.0409442	0.0818884

* Due to merit and promotion.

**1971 Group Annuity Mortality Table for Females.

<u>Age</u>	<u>Male Rates of Disability</u>	<u>Female Rates of Disability</u>	<u>Male Termination</u>	<u>Female Termination</u>
38	0.000000	0.001500	0.0372220	0.0744440
39	0.000000	0.002000	0.0334998	0.0669996
40	0.000000	0.002500	0.0297776	0.0595552
41	0.000000	0.003000	0.0260554	0.0521108
42	0.000000	0.003500	0.0223332	0.0446664
43	0.000000	0.004000	0.0186110	0.0372220
44	0.000000	0.004500	0.0148888	0.0297776
45	0.000000	0.005000	0.0111666	0.0223332
46	0.000000	0.005500	0.0074444	0.0148888
47	0.000000	0.006000	0.0037222	0.0074444
48	0.000000	0.006500	0.0000000	0.0000000
49	0.000000	0.007000	0.0000000	0.0000000
50	0.001000	0.007500	0.0000000	0.0000000
51	0.003100	0.008000	0.0000000	0.0000000
52	0.005300	0.008500	0.0000000	0.0000000
53	0.007400	0.009000	0.0000000	0.0000000
54	0.009600	0.009500	0.0000000	0.0000000
55	0.011700	0.010000	0.0000000	0.0000000
56	0.013000	0.010000	0.0000000	0.0000000
57	0.015500	0.010000	0.0000000	0.0000000
58	0.017400	0.010000	0.0000000	0.0000000
59	0.019100	0.010000	0.0000000	0.0000000
60	0.020600	0.010000	0.0000000	0.0000000
61	0.021400	0.010000	0.0000000	0.0000000
62	0.022000	0.010000	0.0000000	0.0000000
63	0.022000	0.010000	0.0000000	0.0000000
64	0.022000	0.010000	0.0000000	0.0000000

*RATES OF RETIREMENT - MALES AND FEMALES**
(Active Members)

*Table A**Table B**Table C*

<u>Age</u>	<u>Non-Indexed Benefits Rate</u>	<u>Indexed Benefits Rate</u>	<u>For Sensitivity Test of Rates of Retirement</u>
55	0.018	0.05	0.10
56	0.022	0.03	0.06
57	0.030	0.04	0.08
58	0.046	0.06	0.12
59	0.072	0.08	0.16

<i>Age</i>	<i>Table A</i>	<i>Table B</i>	<i>Table C</i>
	<i>Non-Indexed Benefits Rate</i>	<i>Indexed Benefits Rate</i>	<i>For Sensitivity Test of Rates of Retirement</i>
60	0.144	0.25	0.50
61	0.110	0.20	0.40
62	0.125	0.21	0.42
63	0.135	0.22	0.44
64	0.154	0.24	0.48
65	1.000	1.00	1.00

*For Runs #1, #2, #3, #5, #6, #8, #9 and #11, we have assumed that all active 1935 plan members will retire at age 65.

Table A: used in valuing present plan, and alternatives which do not include cost-of-living adjustments after retirement.

Table B: used when valuing cost-of-living adjustments after retirement.

Table C: used for test of sensitivity of rates of retirement on cost of indexed benefits.

